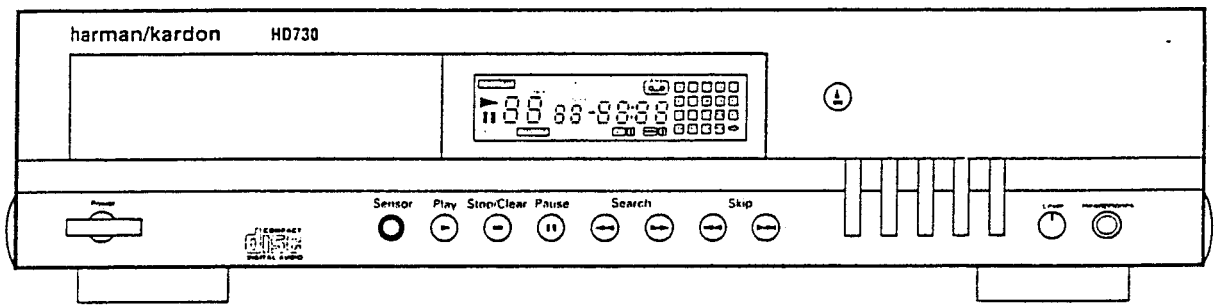
V15378

The Harman Kardon Model HD-730

Manual A

COMPACT DISC PLAYER

Technical Manual



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DANGER: Invisible laser radiation when open and interlock failed or defeated.
AVOID DIRECT EXPOSURE TO BEAM.

harman/kardon

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1112-HD-730 P9512 1500 Printed in Korea

DRAFT

LASER BEAM SAFETY PRECAUTIONS

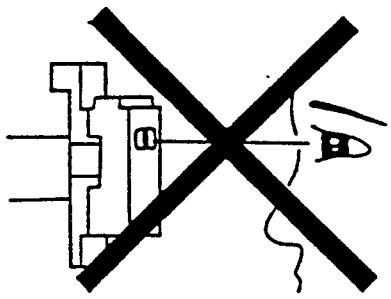
CLASS 1 LASER PRODUCT

CLASS 1
LASER PRODUCT

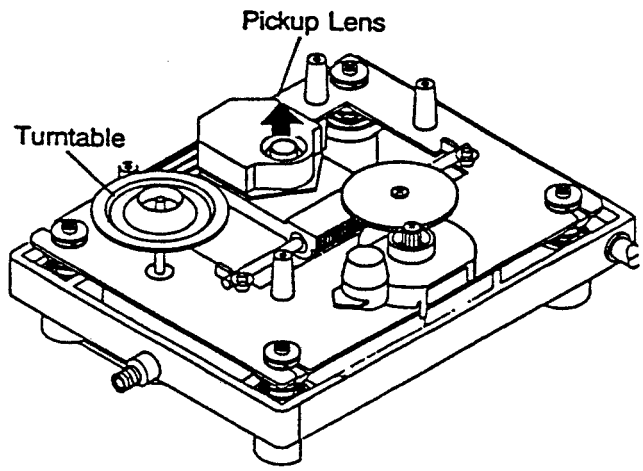
CAUTION
Invisible laser radiation when the unit is open. Do not stare into beam.

CAUTION: USE OF ANY CONTROLS, ADJUSTMENT, OR PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

Do not look directly at the laser beam coming from the pickup or allow it to strike against your skin.



This compact disc player uses a pickup that emits a laser beam. The laser beam is emitted from the location shown in the figure. When checking the laser diode, be sure to keep your eyes at least 1 foot away from the pickup lens when the diode is turned on. Do not look directly at the laser beam.



CAUTION:
Using controls and adjustment, or doing procedures other than those specified herein, may result in hazardous radiation exposure.

SAFETY PRECAUTIONS

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Caution: To prevent electric shock do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

Attention: Pour prévenir les chocs électriques ne pas utiliser cetre fiche polarisée avec un prolongateur, une prise de courant ou une autre sortie de courant, sauf si les lames prévent être insérées à fond sans en laisser aucune partie à découvert.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

HANDLING LASER PICKUP

The laser diode in the optical system of this player can be damaged by electrostatic discharge from your clothes or your body. Proper electrostatic grounding for service personal is required during servicing.

BEFORE REPAIRING THE COMPACT DISC PLAYER

Preparation

- Human Body Grounding:
  Many of the components used in this compact disc player, including the laser pickup, are sensitive to electrostatic discharge. Service personal should be grounded with an electrostatic armband (1 Mohm).

- Caution:
  Static charge on clothing does not escape through a body grounding wrist band.
  Be careful not to contact the pickup or electrical components with your clothing.

- Workbench and Tool Grounding:
  A properly-grounded electroconductive plate (1 Mohm) or metal sheet should be fitted to the workbench surface. Tools and instruments (such as soldering irons and scopes) should be grounded to prevent AC leakage.

Figure 1

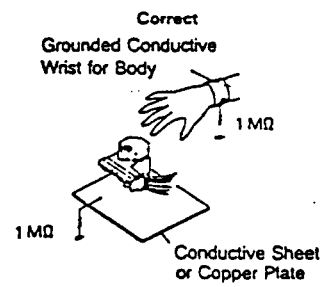


Figure 2

Note: Laser diodes are so susceptible to damage from static electricity that, even if a static discharge does not ruin a diode, it can shorten its life or cause it to work improperly.

LEAKAGE TEST

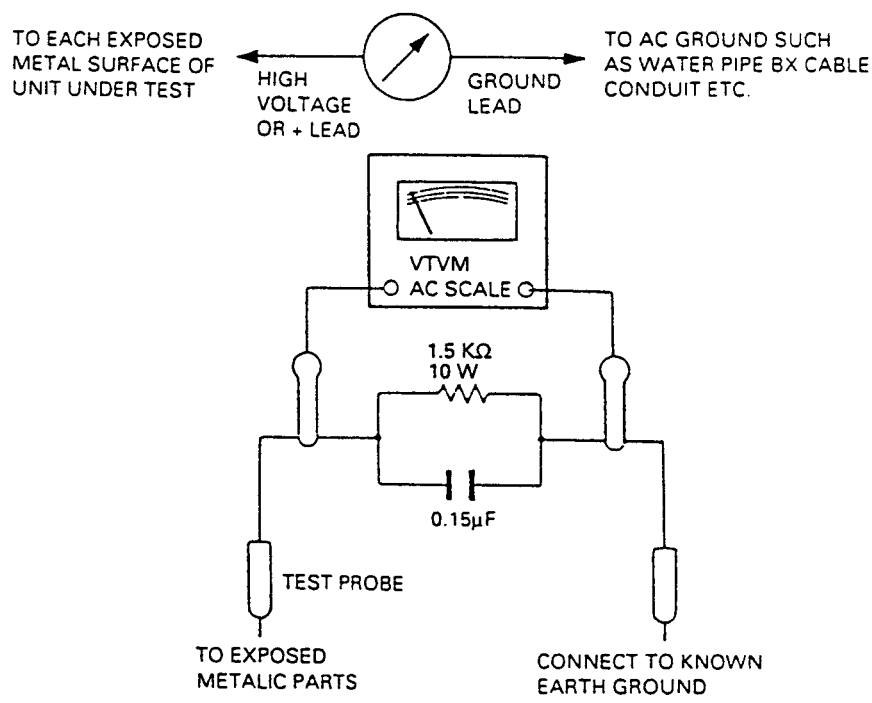
Before returning the unit to the user, perform the following safety checks:

1. Inspect all lead dress to makes certain that leads are not pinched or that hardware is not lodged between the chassis and other metallic parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc. which were removed for servicing are properly reinstalled.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item no. 21641, RCA model WT540A or use alternate method as follows: plug the power cord directly into a 120-volt AC receptacle (do not use an isolation transformer for this test).

Using two clip leads, connects a 1500 ohm, 10-watt resistor paralleled by a 0.15µF capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 ohms per volt, or higher sensitivity to measure the AC voltage drop across the resistor. (see diagram) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the on and off positions.)

A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.

SIMPSON MODEL 229 ETC. FOR LEAKAGE TEST



SPECIFICATIONS

GENERAL

Transmission bit ratio	4.3218 Mbit/sec
Transmission on clock	16.9344 MHz
Error correction	CIRC C1: Double correction C2: Quadruple correction

PICK-UP

System object lens type	Optical pick-up
Object lens drive system	2 Dimensional parallel drive type
Optical source	Semiconductor laser
Wave length	780 nm
Tracking system	3 Beam tracking servo type

OTHERS

D/A Converter	1 bit twin with digital filter
Power supply voltage	See type plate at rear of the unit

ELECTRICAL

*** Preparations**

- Measuring methods in confirmity with EIAJ CP-307, CCIR 468-3
- Reference level: 0 dB
- Test disc: SONY CD-3 YEDS-7, PHILIPS 5A
- Filter: 30 kHz, 18 dB/oct low pass filter

Description	Track	Nominal	Limit
Frequency Response at 20 Hz - 20 kHz	2 - 13	±0.5 dB	±1.0 dB
Signal to Noise Ratio at 1 kHz (Weighted A)	23	100 dB	95 dB
Dynamic Range at 1 kHz, 60 dB (Weighted A)	20	95 dB	92 dB
Total Harmonic Distortion at 0 dB			
100 Hz	4	0.007%	0.01%
1 kHz	7	0.007%	0.01%
20 kHz	13	0.009%	0.015%
Channel Separation at 1 kHz (Selective)	30, 34	90 dB	88 dB
Channel Unbalance at 1 kHz	7	±0.2 dB	±0.5 dB
Access Time (Track to next track)		1 sec	1.5 sec
Disc Defects			
Black dot	10 - 15	1000 uM	800 uM
Interrupt	3 - 9	1000 uM	800 uM
Fingerprint	17 - 19	ALL	ALL
Demphais	39	±0.2 dB	±0.3 dB
	40	±0.3 dB	±0.5 dB
	41	±0.5 dB	±1.0 dB

ENVIRONMETAL

Test to specification

Temperature between 59°F (15°C) and 95°F (35°C) and relative humidity between 45% and 75%, with power supply voltage of 10% the normal supply voltage.

Test disc: SONY YEDS-7 or ABEX TCD784, TCD725.

Operation

Unit must work properly and correctly at the temparature range from 32°F (0°C)to 113°F (45°C) and the relative humidity from 40% to 80%, and with the supply voltage.

Storage

Temperature test: 48 hours each at -40°F (-40°C) and 149°F (65°C).

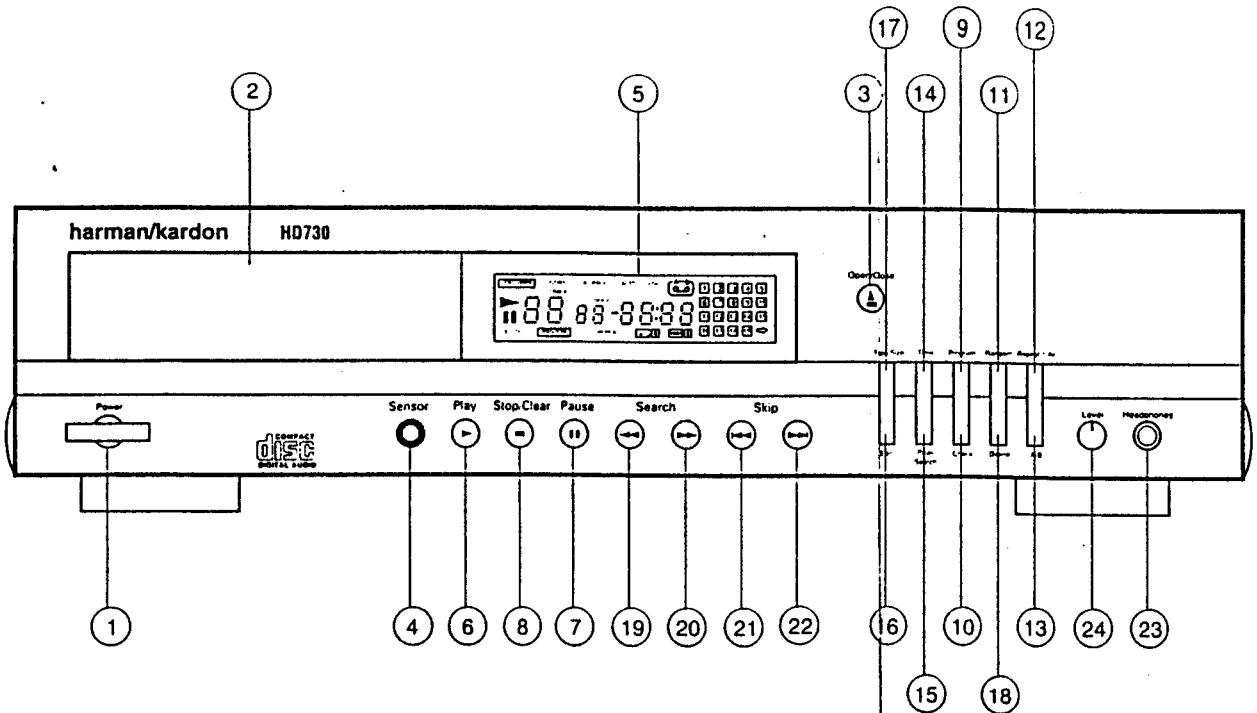
Humidity test: 40°C, 95% relative humidity.

POWER CONSUMPTION	12 W
DIMENSIONS (W x H x D)	440 x 95 x 300 mm
WEIGHT	4.8 kg (10.6 lbs)
POWER SUPPLIES	AC 230 V, 50 Hz

Specifications and components subject to change without notice.

Overall performance will be maintained or improved.

CONTROL AND FUNCTIONS



1. POWER SWITCH
The POWER switch turns the unit on and off.

2. COMPACT DISC DRAWER
Load a disc (full-size or 3-inch/8 cm) into your compact disc player by placing it in this drawer with the label side up. Open and close the drawer using the OPEN/CLOSE button (3).

3. OPEN/CLOSE BUTTON (⏏)
Press this button to open or close the compact disc drawer. The drawer will also close if you press the PLAY button or push the drawer gently toward the chassis of the player; however, we recommend that you do not push the drawer.

4. REMOTE SENSOR
This area receives the signal from the remote control unit. Make sure this area of the front panel is kept free from dirt or other obstructions that might prevent proper reception of the infrared signal from the remote control.

5. MULTI-FUNCTION DISPLAY
This display shows the corresponding information according to each mode.

6. PLAY BUTTON(▶)
This button is used for starting play.

7. PAUSE BUTTON(II)
This button is used for holding play at the start of a track or interrupting play.

8. STOP/CLEAR BUTTON(■)
This button is used for stopping play, clearing programmed tracks or recovering the deleted tracks.

9. PROGRAM BUTTON
This button is used for storing the tracks in the Program mode or in the Edit mode.

10. PROGRAM/CHECK BUTTON
This button is used for checking the stored tracks.

11. RANDOM PLAY BUTTON
This button is used for playing a disc randomly.

12. REPEAT 1/ALL BUTTON
This button is used for repeating one track or all tracks.

13. REPEAT A ↩ B BUTTON
This button is used for repeating a particular passage.

14. TIME BUTTON
This button is used for checking the elapsed playing time from the beginning of current track or remaining playing time of current track or remaining playing time of disc.

15. PEAK SEARCH BUTTON
This button is used for searching for a peak level passage on a CD to adjust record level.

16. EDIT BUTTON
This button is used for editing the tracks to be recorded onto the cassette tape.

17. TAPE SIZE BUTTON
This button is used for selecting the tape length.

18. DELETE BUTTON
This button is used for deleting the undesired tracks.

19. BACKWARD SEARCH BUTTON(◀◀)
This button is used for searching for a particular passage in fast reverse.

20. FORWARD SEARCH BUTTON(▶▶)
This button is used for searching for a particular passage in fast forward.

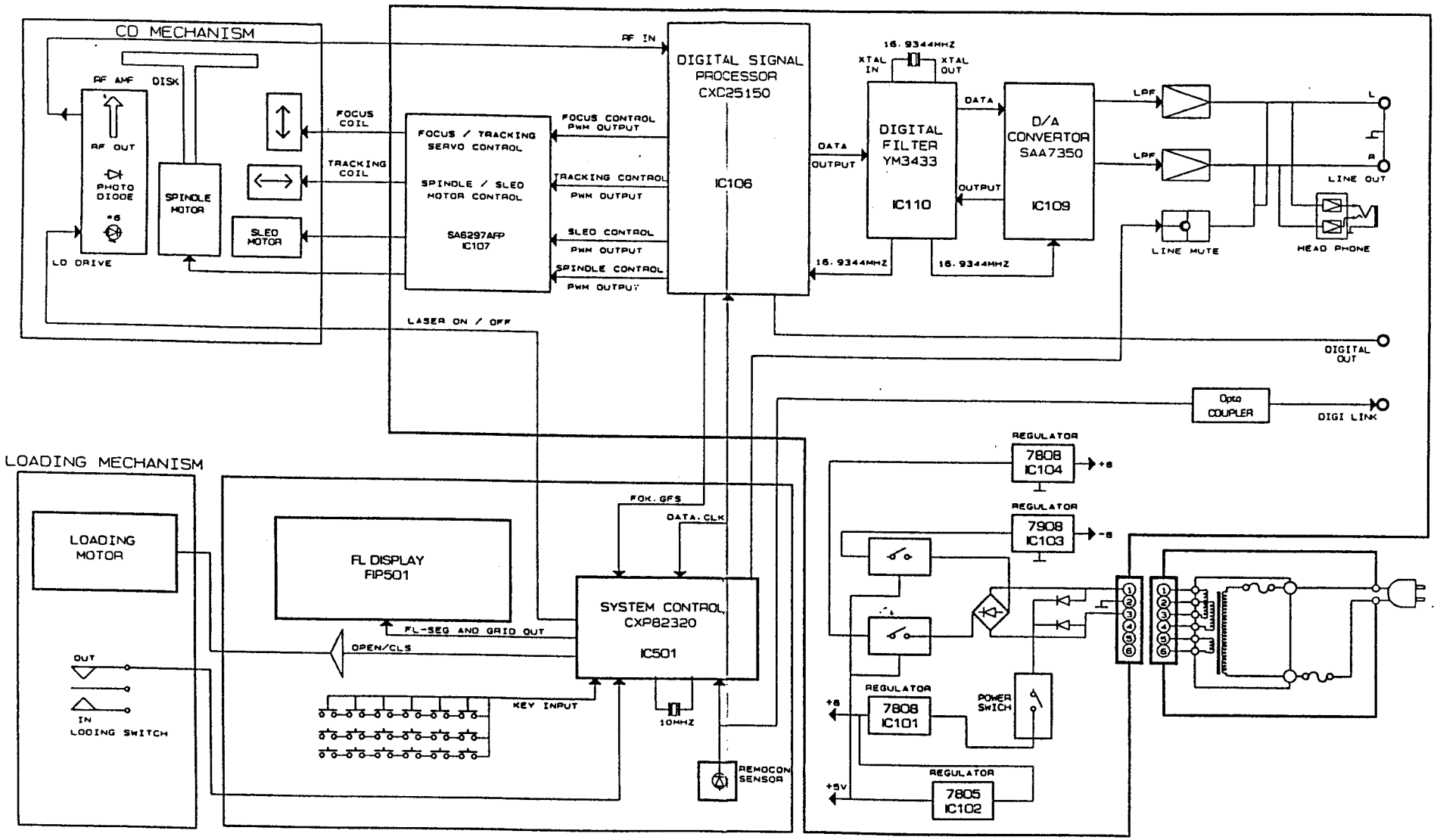
21. BACKWARD SKIP BUTTON(I◀◀)
This button is used for replaying from the beginning of the current track or returning to a previous track.

22. FORWARD SKIP BUTTON(▶▶I)
This button is used for moving onto the next track.

23. HEADPHONE JACK
This JACK is used for listening with the headphone.

24. HEADPHONE VOLUME
This is used for the adjustment of the headphone and variable audio output level.

BLOCK DIAGRAM



DISASSEMBLY PROCEDURES

[1] COVER TOP REMOVAL

1) Remove screws ① to ⑥ in Fig. 3, and then remove the cover by sliding it to its rear a little.

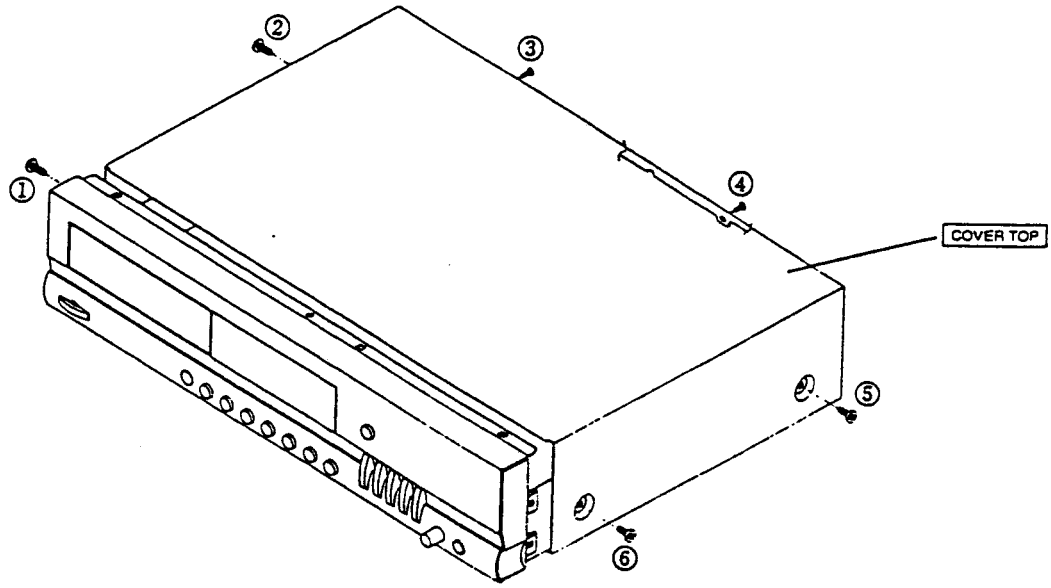


Fig. 3

[2] FRONT PANEL ASSEMBLY REMOVAL

1) Remove the cover top. (Refer to step [1])
2) Remove screws ① to ⑤ in Fig. 4.
3) Detach the connectors CNT109, and CNT107 from the PCB1.
4) Detach the connector from the PCB6.
5) Remove the front panel assembly by pressing the hooks of both sides and pulling it toward you gently.

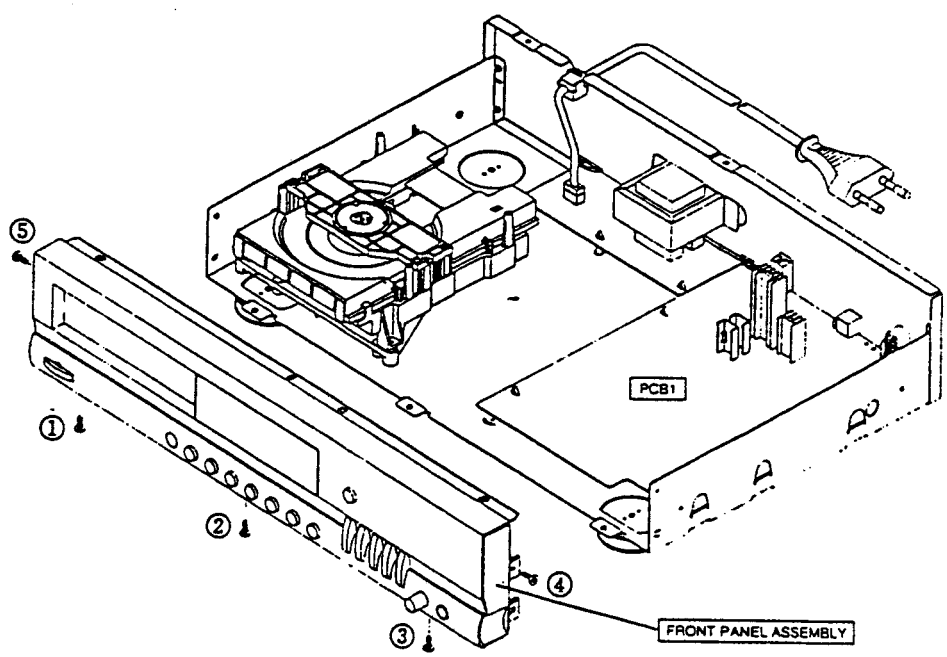


Fig. 4

[3] PCB4(FRONT) REMOVAL

1) Remove the front panel assembly (Refer to step [2]).
2) Remove screws ④ to ⑦ in Fig. 5 and remove PCB4 by Pressing the hooks arround it outward.

[4] PCB3(PHONE) REMOVAL

1) Remove the front Panel assembly (Refer to step [2]).
2) Pull out the knob(Level) in Fig. 5.
3) Remove screws ① to ③ in Fig. 5 and pull front panel toward you gently.
4) Remove the hex nuts(Level/Headphones) in Fig. 5 and then remove PCB3.

[5] PCB5(POWER SWITCH) REMOVAL

1) Remove the front panel assembly (Refer to step [2]).
2) Remove screws ⑧ and ⑨ Fig. 5 and then remove PCB5.

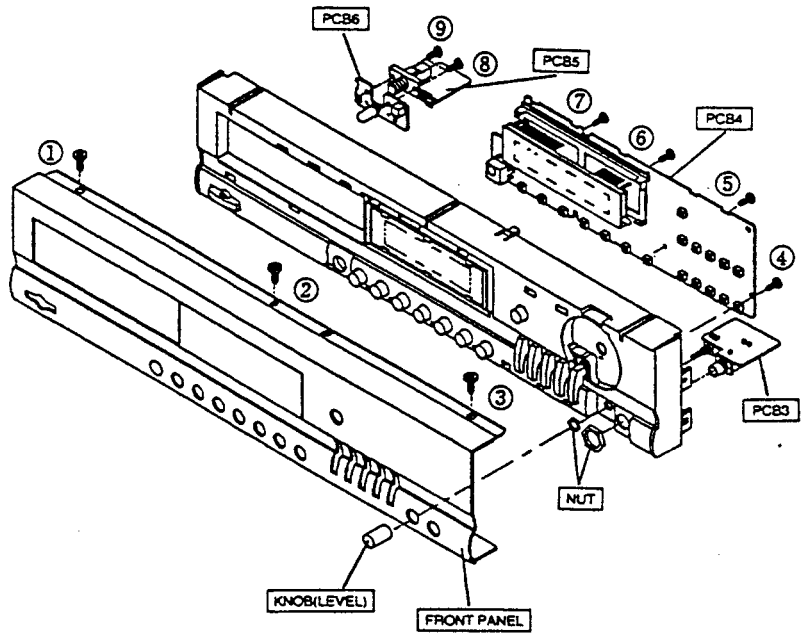


Fig. 5

[6] PCB6(LED) REMOVAL

1) Remove PCB5 (Refer to step [5]).
2) Press the hooks of both sides inward in Fig. 6.
   Then PCB6 is removed automatically.

[7] CD MECHANISM REMOVAL

1) Remove the cover top (Refer to step [1]).
2) Detach the connectors CNT103, CNT104, CNT105 from the PCB1.
3) Remove screws ⑱ to ⑳ in Fig. 6 and then remove the CD mechanism.

[8] PCB7(MECHA CONTROL) REMOVAL

1) Remove the CD mechanism (Refer to step [7]).
2) Remove screws ㉑ to ㉓ in Fig. 6 and then remove PCB7.

[9] PCB1(MAIN) REMOVAL

1) Remove the cover top (Refer to step [1]).
2) Detach the connectors CNT103, CNT104, CNT105, CNT101, CNT102, CNT107, CNT106 from the PCB1.
3) Remove screws ⑩ to ⑮ in Fig. 6 and then remove PCB1.

[10] PCB2(POWER TRANS) REMOVAL

1) Remove the cover top(Refer to Step [1])
2) Detach the connectors CNT101 and CNT102 from the PCB1.
3) Remove screws ⑯ and ⑰ in Fig. 6 and then remove PCB2.

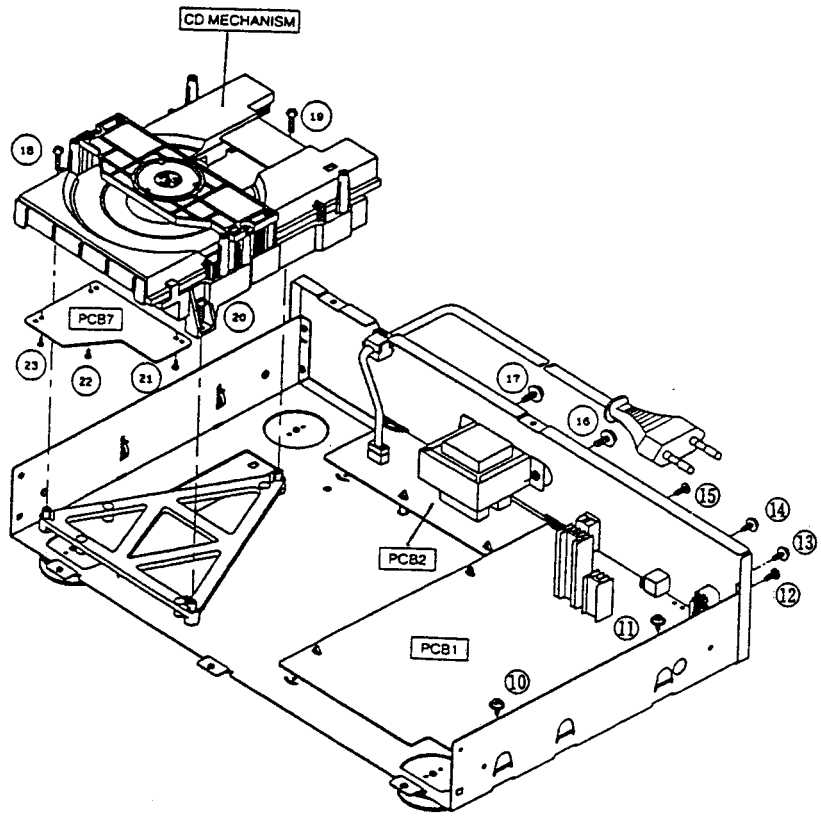


Fig. 6

PICKUP REPLACEMENT

Caution:
Laser diodes are extremely susceptible to damage from static electricity. Even if a static discharge does not ruin the diode, it can shorten its life or cause it to work improperly. When replacing the pickup, take appropriate measures, such as using a conductive mat and a grounded soldering iron, to protect the laser diode from static damage.

1. Remove the CD mechanism assembly by referring to the "EXPLODED VIEW II" on page 27 (See Fig. 7).

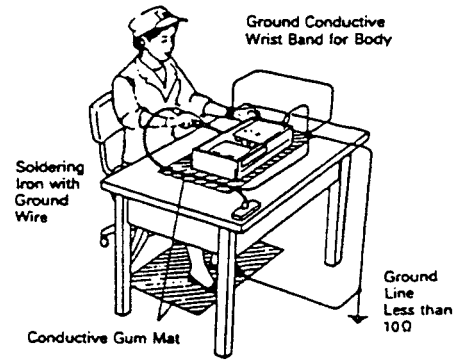


Fig. 7

2. Remove four screws S12 (See Fig. 8).

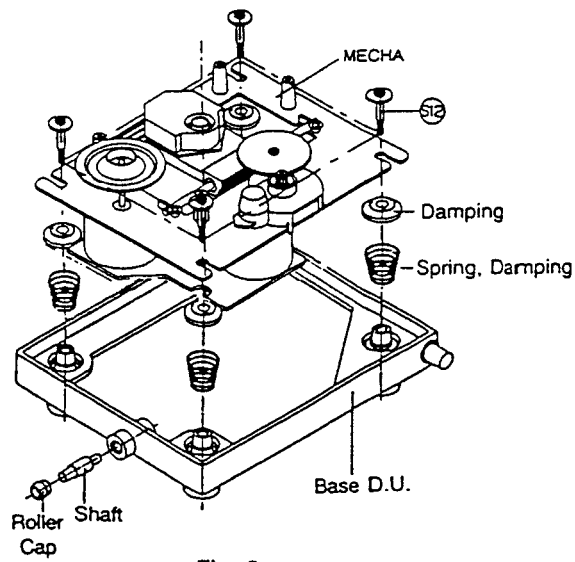


Fig. 8

3. Remove the gear A (See Fig. 9).
4. Pull out the slide shaft.

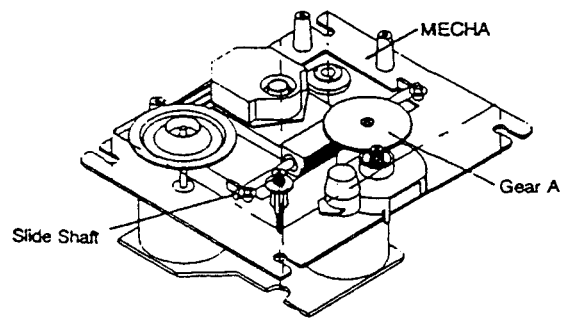


Fig. 9

5. Remove the pickup (See Fig. 10).

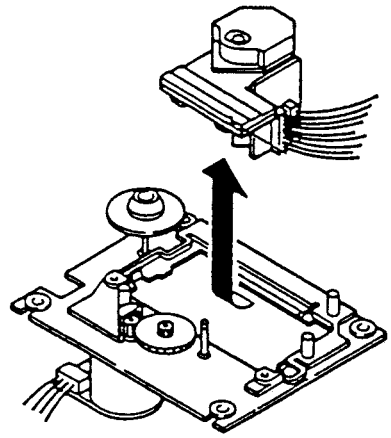


Fig. 10

6. After you connect the wire connector, desolder and remove the shorting tab (See Fig. 11).

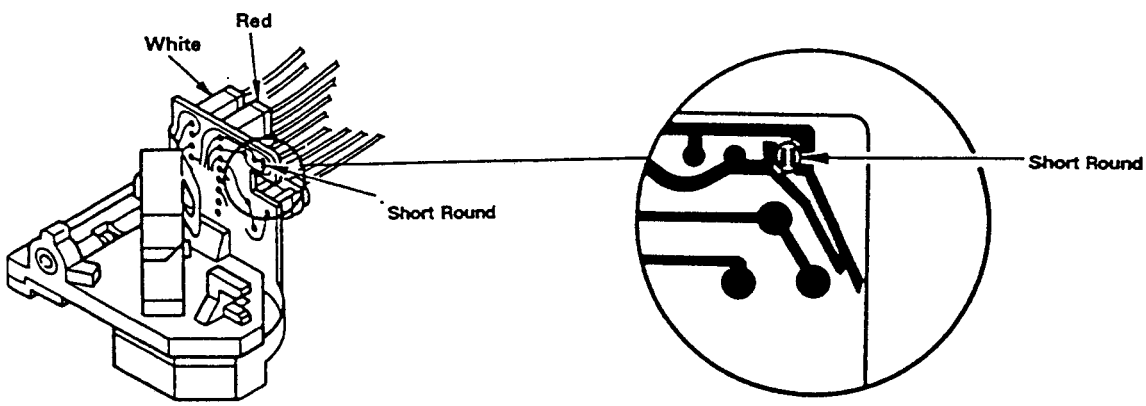


Fig. 11

7. Refer to the EXPLODED VIEW II of the compact disc mechanism on page 27 for detailed illustrations.

OPERATION CHECK

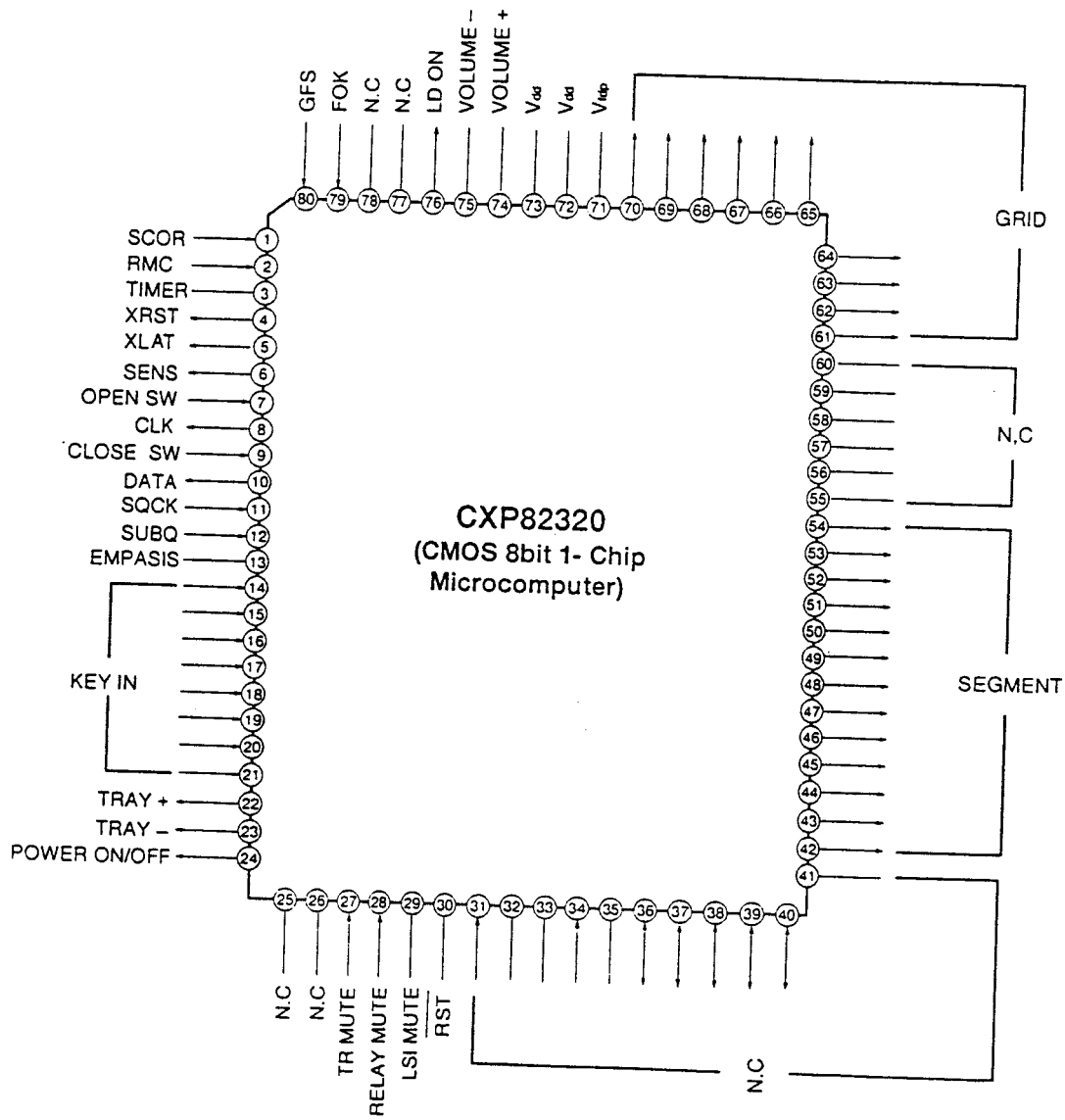
When the power switch is turned on after the chucking arm is removed, observe the objective lens and check the following. (The optical system block should be at the lead-in position when it is checked.)

1. The disc table should be at the innermost position after the chucking arm is removed.
2. The diffused light of the laser beam can be seen when the power switch is turned on.
3. Vertical (up and down) movement of the objective lens take place (2 or 3 times).

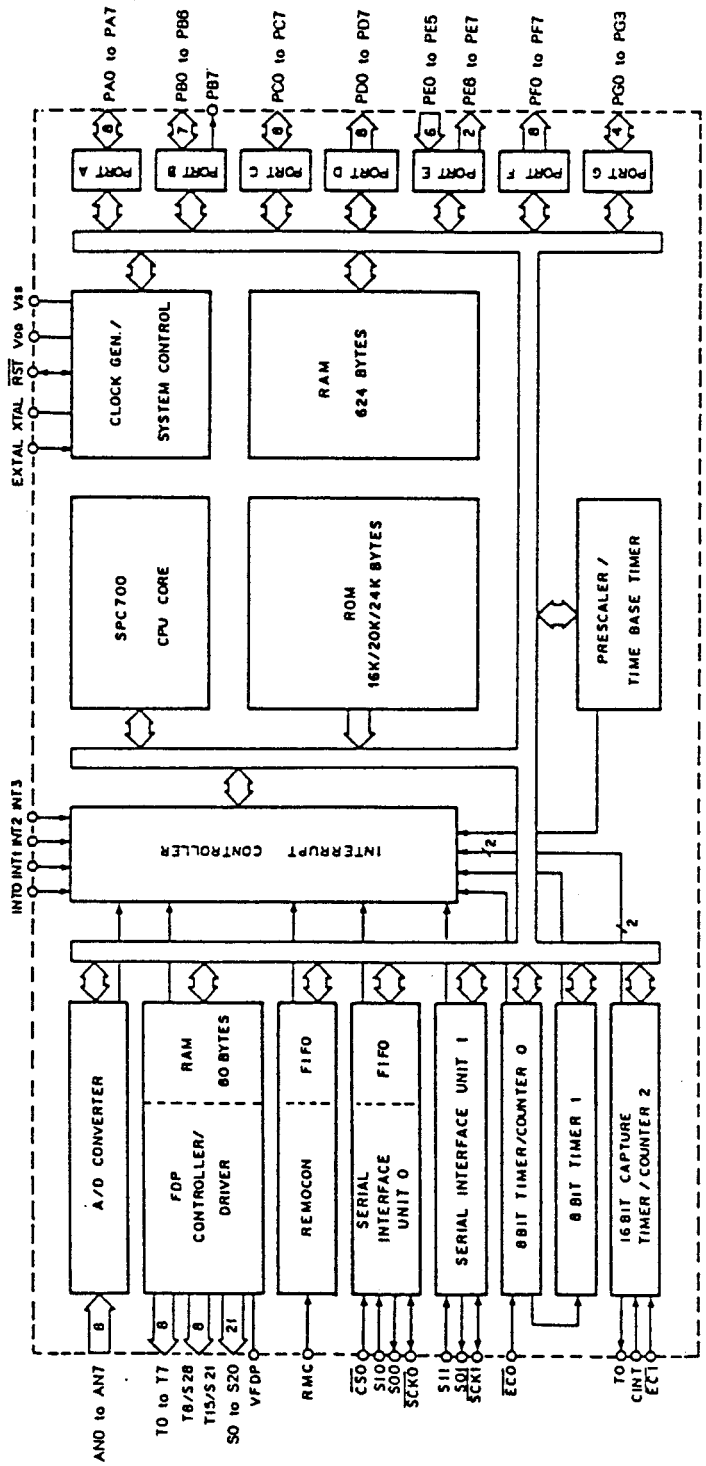
CIRCUIT DESCRIPTION

1. IC501 : CXP82320(CMOS 8bit 1-Chip Microcomputer)

1-1 Pin Connection Diagram



1-2 Block Diagram



1-3 Pin Function

Pin No.	Symbol	Description
1	SCOR	Subcode-Q readout timming signal input from CXD2515Q.
2	RMC	Input for remocon data.(At "L", it is active)
3	TIMER	Not Used !
4	XRST	Output for resetting CXD2515Q.(At "L", it is active)
5	XLAT	Serial latch data output to CXD2515Q.
6	SENS	Sense signal input from CXD2515Q.
7	OPEN SW	Input to detect that tray is opened. (At "L", it is active)
8	CLK	Serial clock data output to CXD2515Q.
9	CLOSE SW	Input to detect that tray is closed. (At "H", it is active)
10	DATA	Serial data output to CXD2515Q.
11	SQCK	Clock data output for subcode-Q readout to CXD2515Q.
12	SUBQ	Subcode-Q signal input from CXD2515Q.
13	EMPASIS	Not Used !
14-21	KEY IN	Data input for key scan.
22	TRAY +	Output for driving motor to open the tray.(At "H", it is active)
23	TRAY -	Output for driving motor to close the tray.(At "H", it is active)
24	POWER ON/OFF	Output to switch on or off +8V and -8V power supply.
25/26		Not Used !
27	TR MUTE	Output for audio mute.(At "H", it is active)
28	RELAY MUTE	Not Used !
29	LSI MUTE	Not Used !
30	RST	Input for resetting CPU.(At "L", it is active)
31-41		Not Used !
42-50	SEGMENT	Segment signal output for FIP.
51-54	SEGMENT	Segment signal output for FIP and data output for key scan
55-60		Not Used !
61-70	GRID	Grid signal output of 10G - 1G for FIP.
71	VFDP	-30V power supply for FIP controller.
72,73	Vdd	+5V power supply for CPU.
74	VOLUME+	Not Used !(It should be left open)
75	VOLUME-	Not Used !(It should be left open)
76	LD ON	LD ON signal output to pick-up unit(M101).
77,78		Not Used !
79	FOK	FOK signal input from CXD2515Q.
80	GFS	GFS signal input from CXD2515Q.

2. APC CIRCUIT

A semiconductor laser is used as the light source for the optical pickup. As the laser diode has large negative temperature characteristics in its optical output when driven with a constant current, a circuit must be provided to stabilize this output. For this purpose, a monitor diode which detects the optical output of the laser diode is used in the semiconductor laser.
As the laser diode emits light from its bonded surface, light is emitted both in front and behind. The light emitted behind is monitored with the monitor diode installed on its rear surface, and the optical output is thus controlled. The light emitted in front becomes the light source for the pickup.

Fig. 12 shows the APC circuit.
When the temperature rises and the optical output decreases, the monitor diode current (Is) decreases, the electric potential of OE-IC pin 24 rises, the base current of the driving transistor increases, and the laser diode current increases. This causes the reduced optical output to return to its former level.

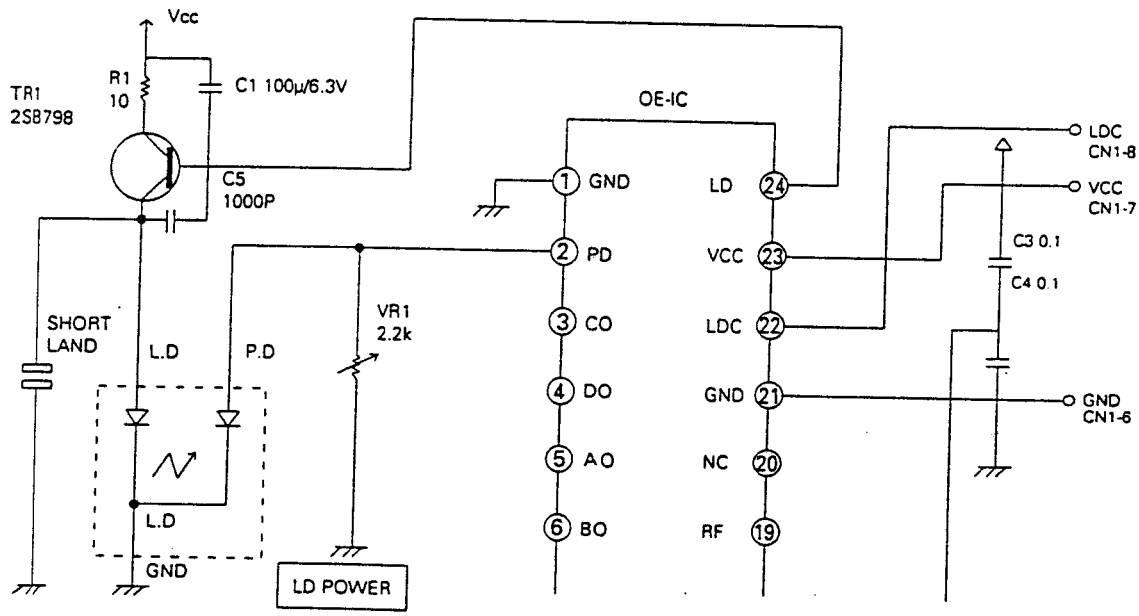
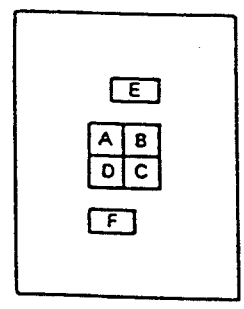


Fig. 12

3. FOCUS SERVO

3-1. Optical pickup

This set employs a three-beam optical pickup comprised of six division photodiodes, A through F as shown in Fig. 13. The four photo diodes (A through D) at the center provide focus error detection by using their property to allow the beam to focus into a round image only at a certain point.
The sums of outputs from diagonal two elements of four division photo diodes (A+C and B+D) are compared by the differential amplifier in OE-IC to detect the shape of the beam image.
The remaining two diodes (E and F) provide tracking error detection by means of sub-beam spots.



Three spotted (six-division) photo diodes

Fig. 13

3-2. Focus error detecting operation

Fig. 14 shows the reflected laser beam from a disc is polarized 90° with the beam-splitter and sent to the cylindrical lens. The beam passed through this cylindrical lens is then sent to the four division photo diodes and focuses into an image whose shape varies with the distance between the disc and the objective lens. Such change in the beam shape causes the current flowing from the photo diodes to vary.

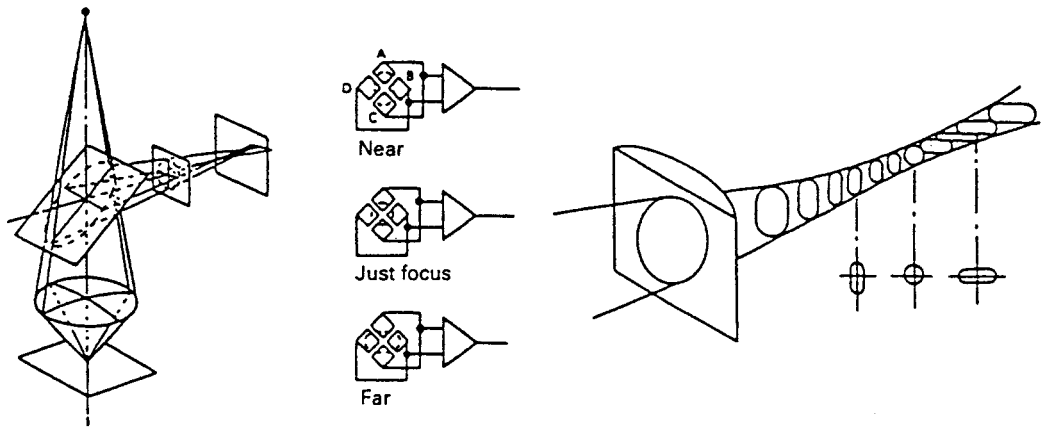


Fig. 14

3-3. Tracking error detection system

Fig. 15 shows the principle of the tracking error detection system which employs the three beam system.

The laser beam is divided into the main beam and two sub-beams by diffraction grating and they are arranged on one line. The center line connecting these three beams has a slight offset angle against the main beam. The main beam is received by photo diodes A, B, C and D and two sub-beams by E and F respectively.

Fig. 15-A shows the on-track state. As both auxiliary beams 1 and 2 are slightly on the track in this state, the outputs of photo diodes E and F are equal and the tracking signal is 0(zero). When the track is shifted to the left (Fig. 15-B), the auxiliary beam 1 is off the pit. This allows more light to be received by the photo diode E, resulting in positive (+) tracking signal output. On the other hand, when the track is shifted to the right (Fig. 15-C), the amount of light received by the photo diode F increases, resulting in negative (-) tracking signal output. And these extreme signals are detected as tracking error signals.

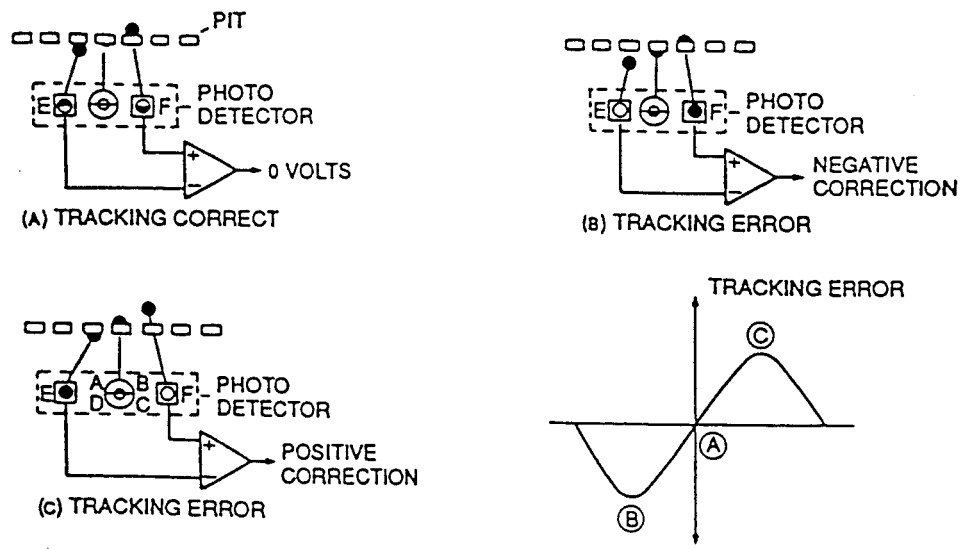


Fig. 15

4. Audio Circuit

4-1. Configuration of SAA7350

Fig. 16 shows the configuration of the SAA7350

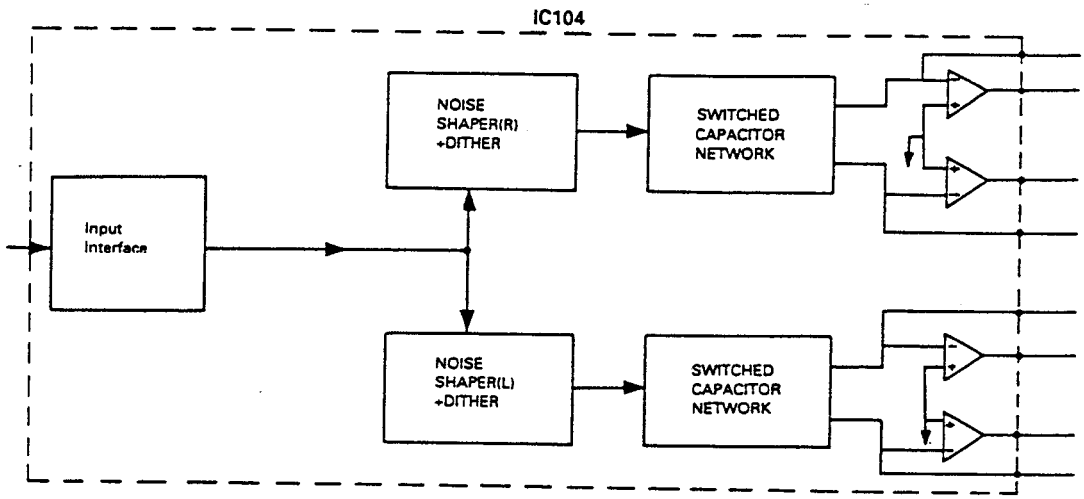


Fig. 16

The digital-to-analogue conversion in the SAA7350 is performed using the Philips Bitstream Conversion technigue. The input from the digital filter is oversampled and converted to a 1-bit pulse density modulated(PDM) signal. A switched capacitor technigue is used for the Bitstream Conversion to convert the PDM signal to an analogue signal. A fixed charge is either added or substracted from the virtual earth node of an integrator. As this output is a continous time output, a highly symmetrical operational amplifier is used to give a low distortion figure.

To the low-pass filter of the discrete circuit configuration of the following sfage as an audio signal.

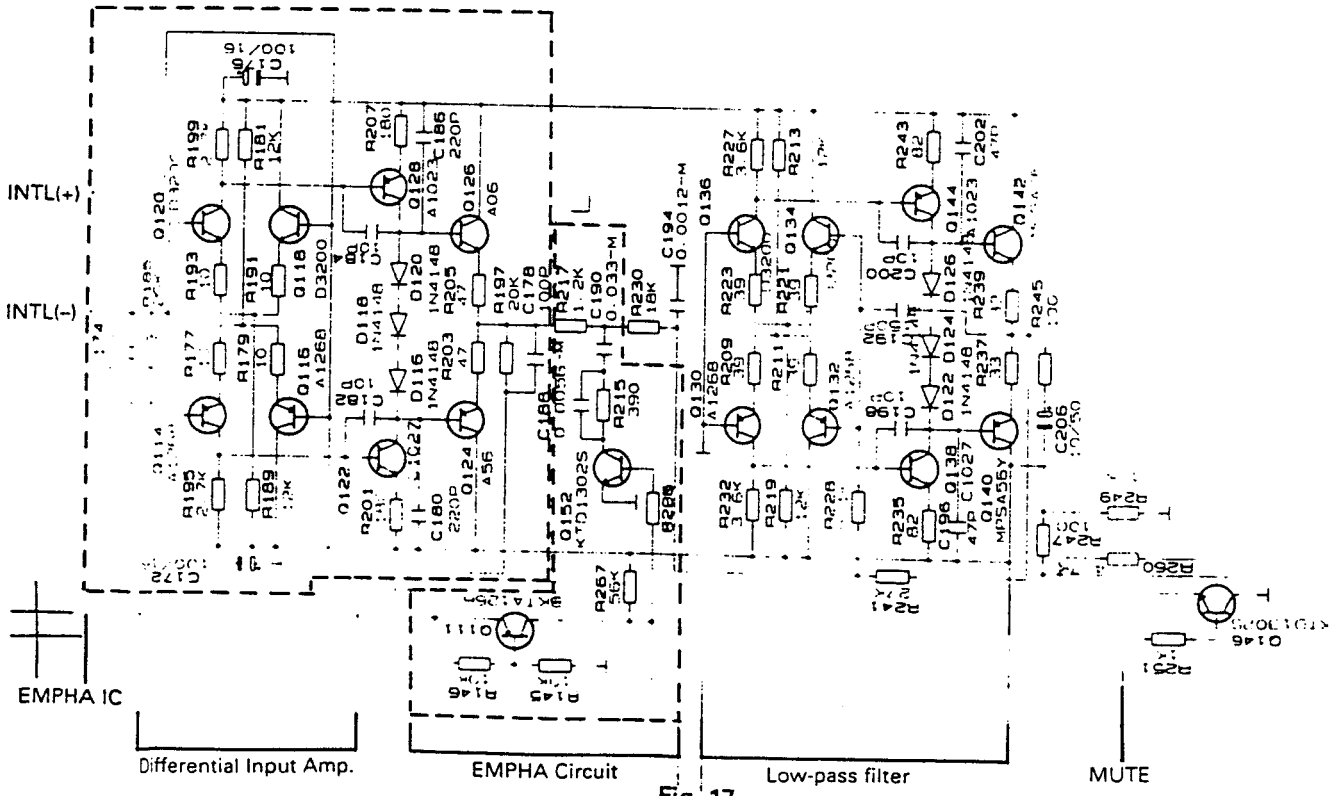
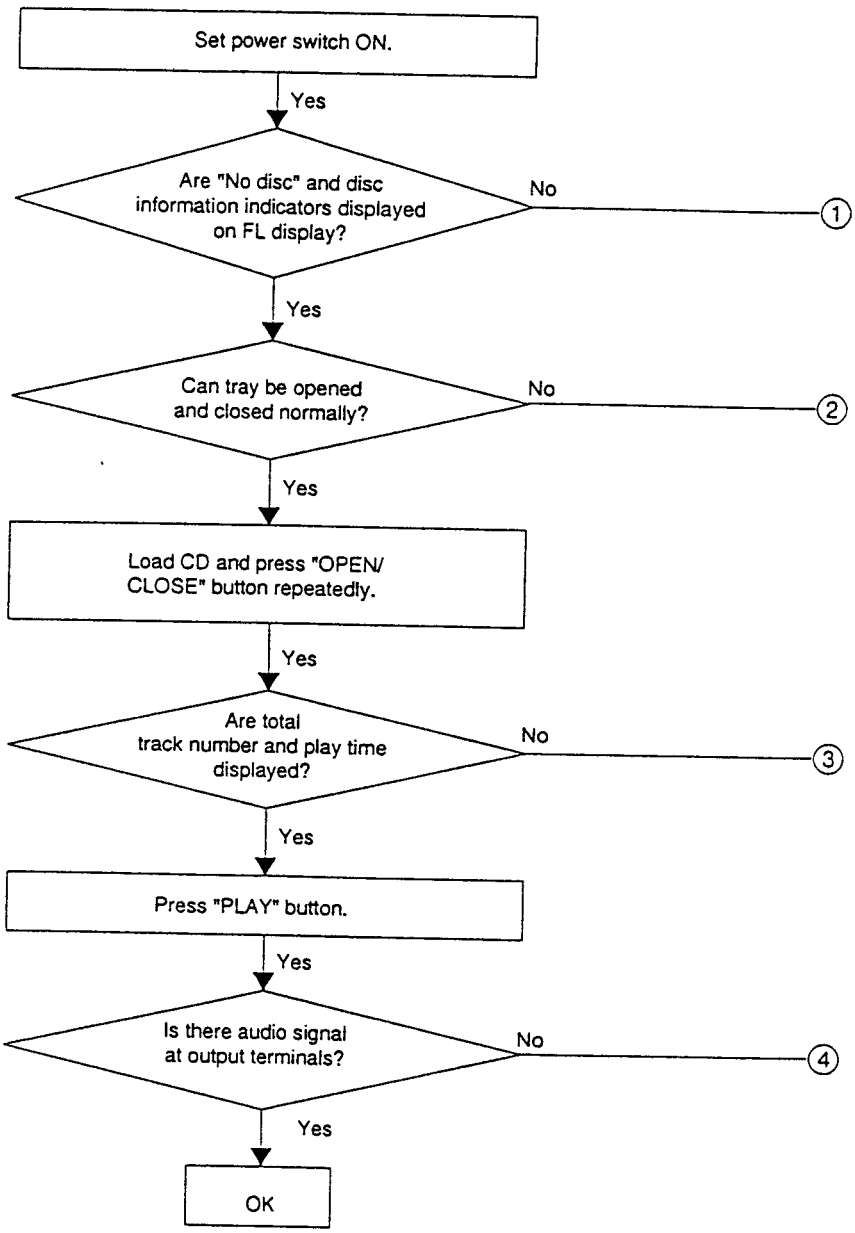
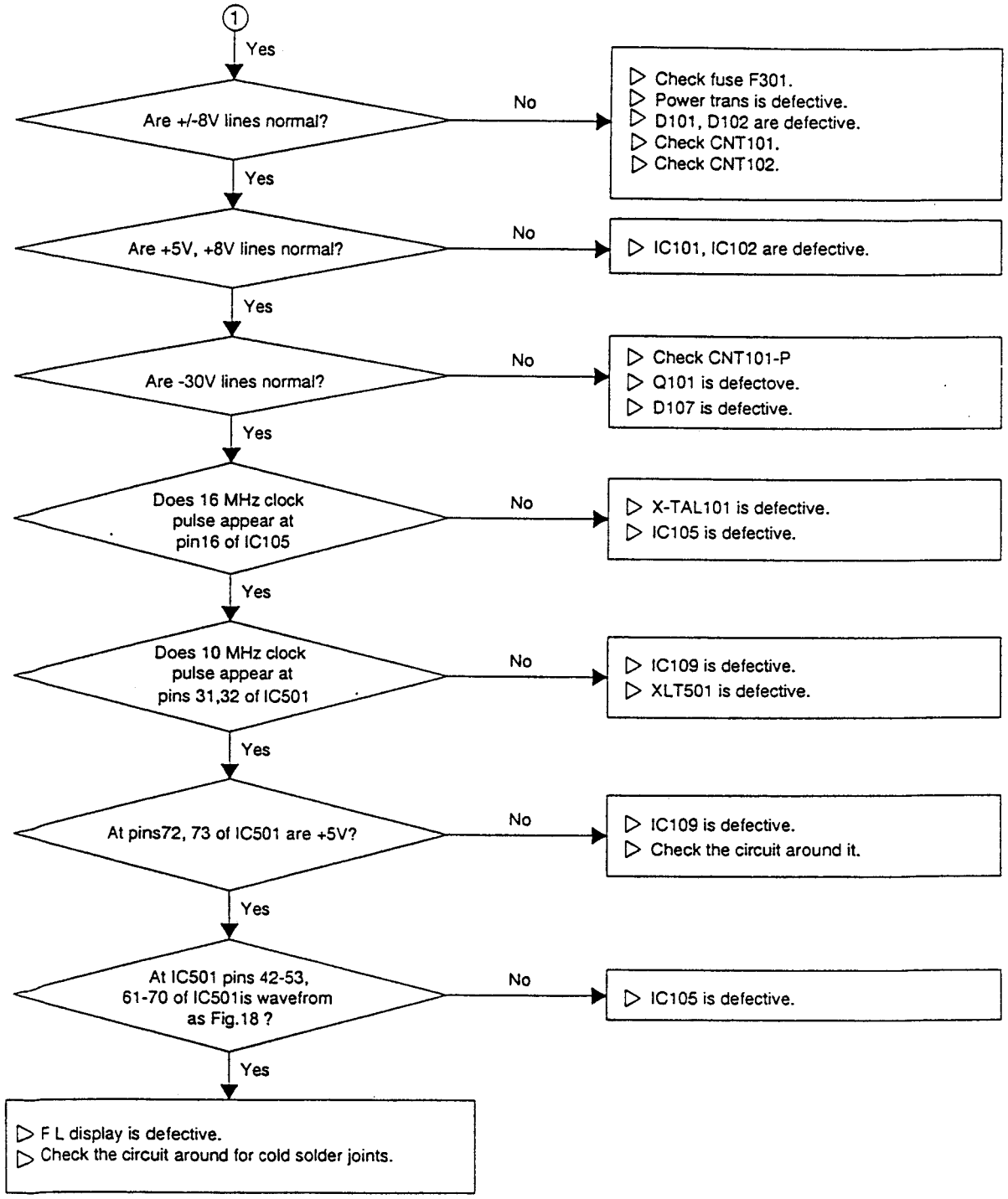


Fig. 17

TROUBLESHOOTING



[Repair item 1] At power on, "0" and some parts are not displayed.



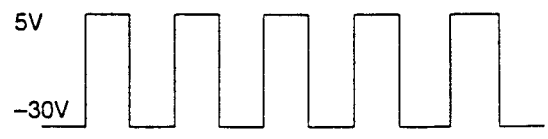
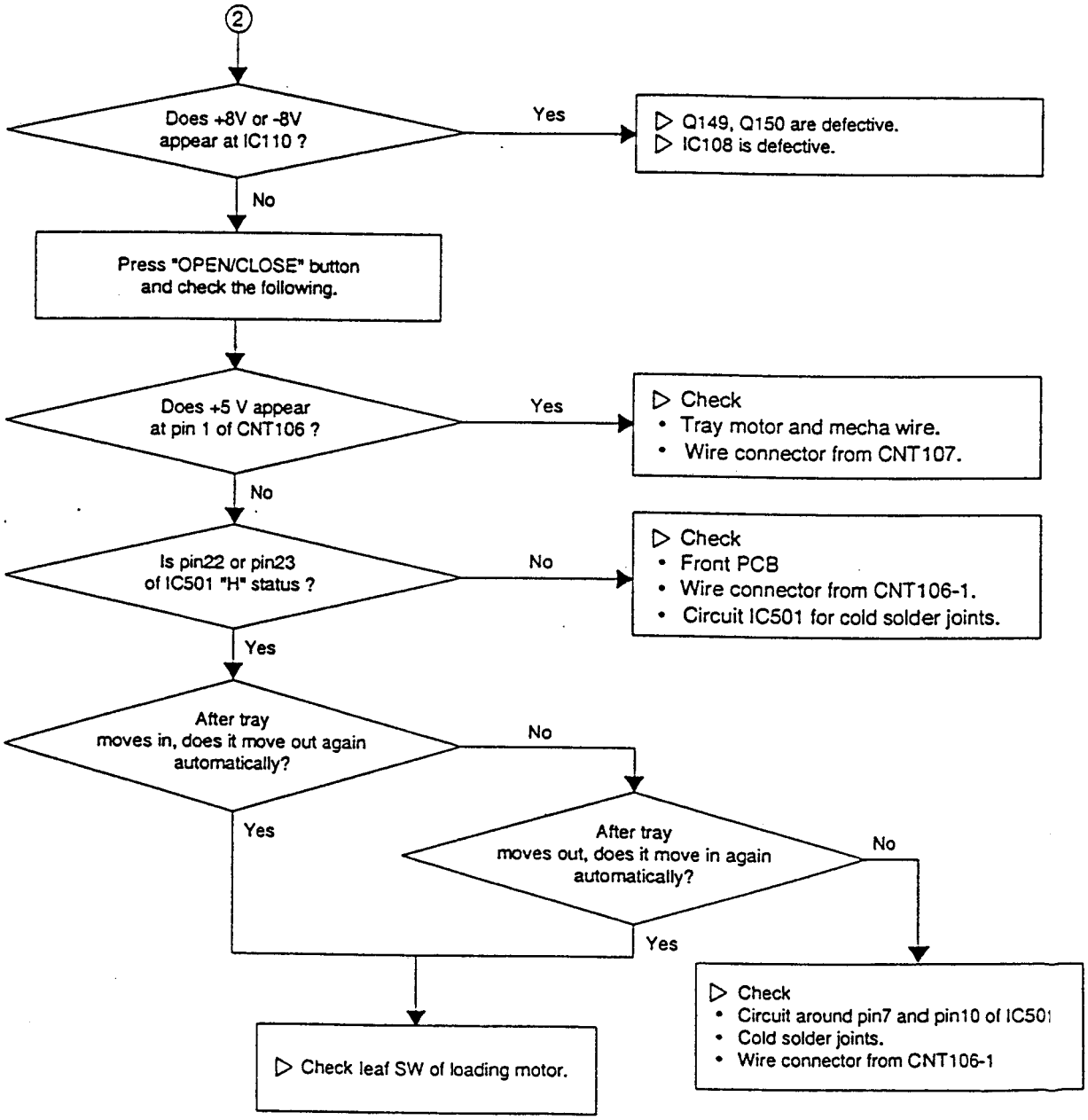
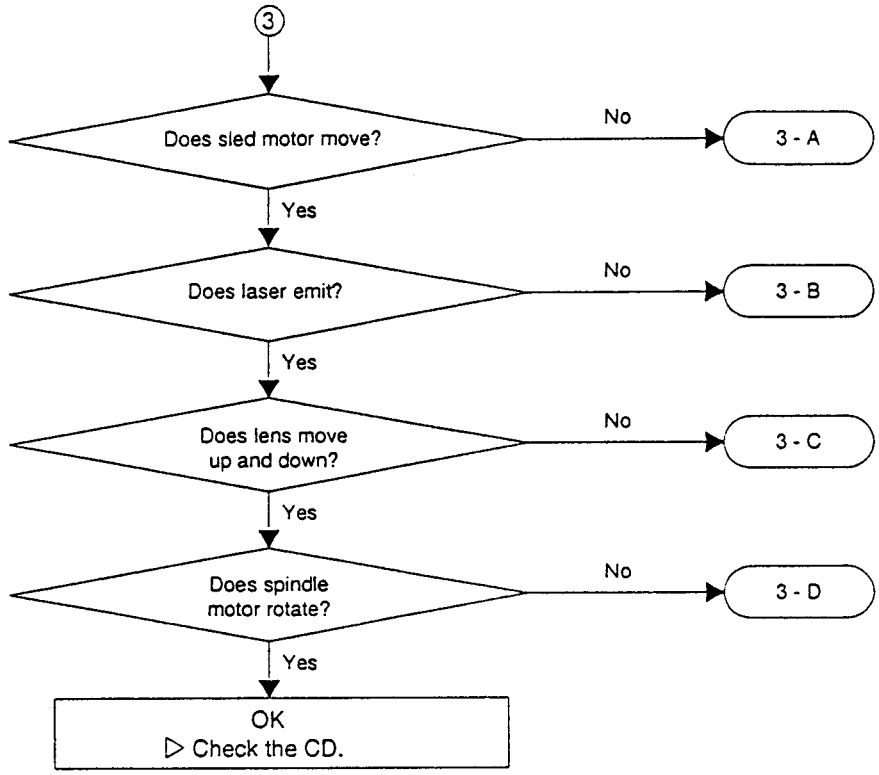


Fig.18

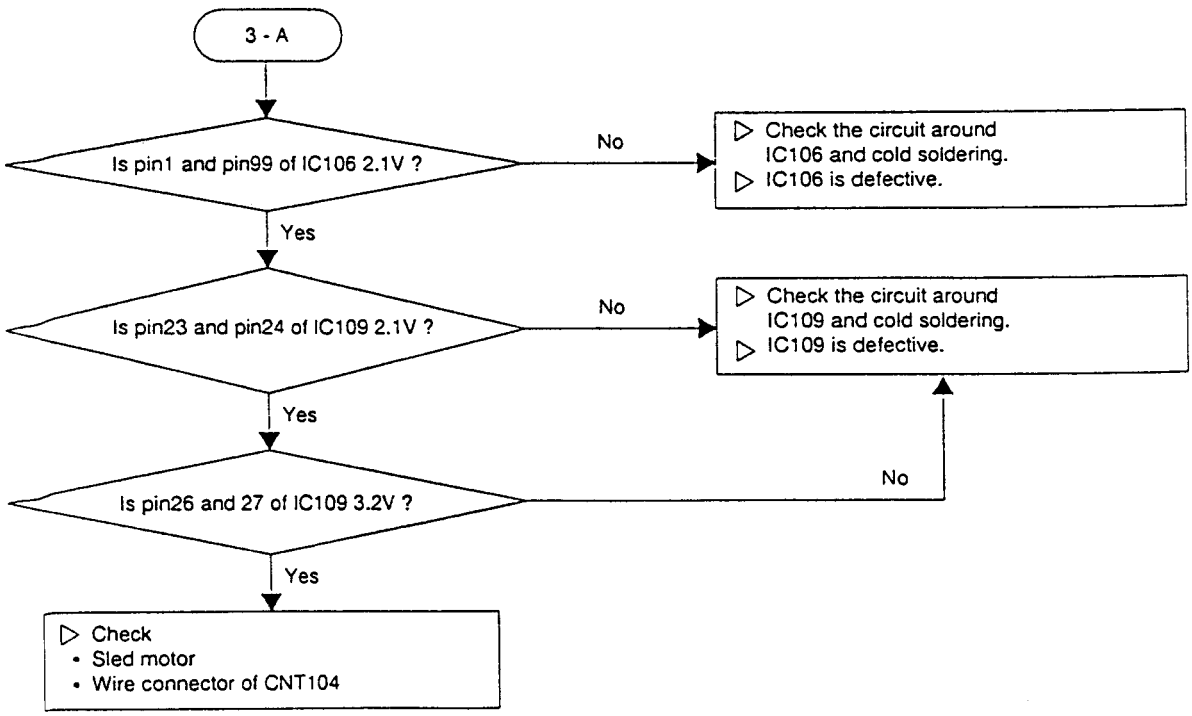
[Repair item 2] Tray cannot be opened and closed by pressing "OPEN/CLOSE" button.


②
Does +8V or -8V appear at IC110 ?
Yes
▷ Q149, Q150 are defective.
▷ IC108 is defective.
No
Press "OPEN/CLOSE" button and check the following.
Does +5 V appear at pin 1 of CNT106 ?
Yes
▷ Check
• Tray motor and mecha wire.
• Wire connector from CNT107.
No
Is pin22 or pin23 of IC501 "H" status ?
No
▷ Check
• Front PCB
• Wire connector from CNT106-1.
• Circuit IC501 for cold solder joints.
Yes
After tray moves in, does it move out again automatically?
No
Yes
After tray moves out, does it move in again automatically?
No
Yes
▷ Check
• Circuit around pin7 and pin10 of IC501
• Cold solder joints.
• Wire connector from CNT106-1
▷ Check leaf SW of loading motor.

[Repair item 3] "0" is displayed instead of total playing time and track number.



[Repair item 3-A] Sled motor does not move.


3 - A
Is pin1 and pin99 of IC106 2.1V ?
No
▷ Check the circuit around IC106 and cold soldering.
▷ IC106 is defective.
Yes
Is pin23 and pin24 of IC109 2.1V ?
No
▷ Check the circuit around IC109 and cold soldering.
▷ IC109 is defective.
Yes
Is pin26 and 27 of IC109 3.2V ?
No
Yes
▷ Check
• Sled motor
• Wire connector of CNT104

[Repair item 3-B] Laser does not emit.

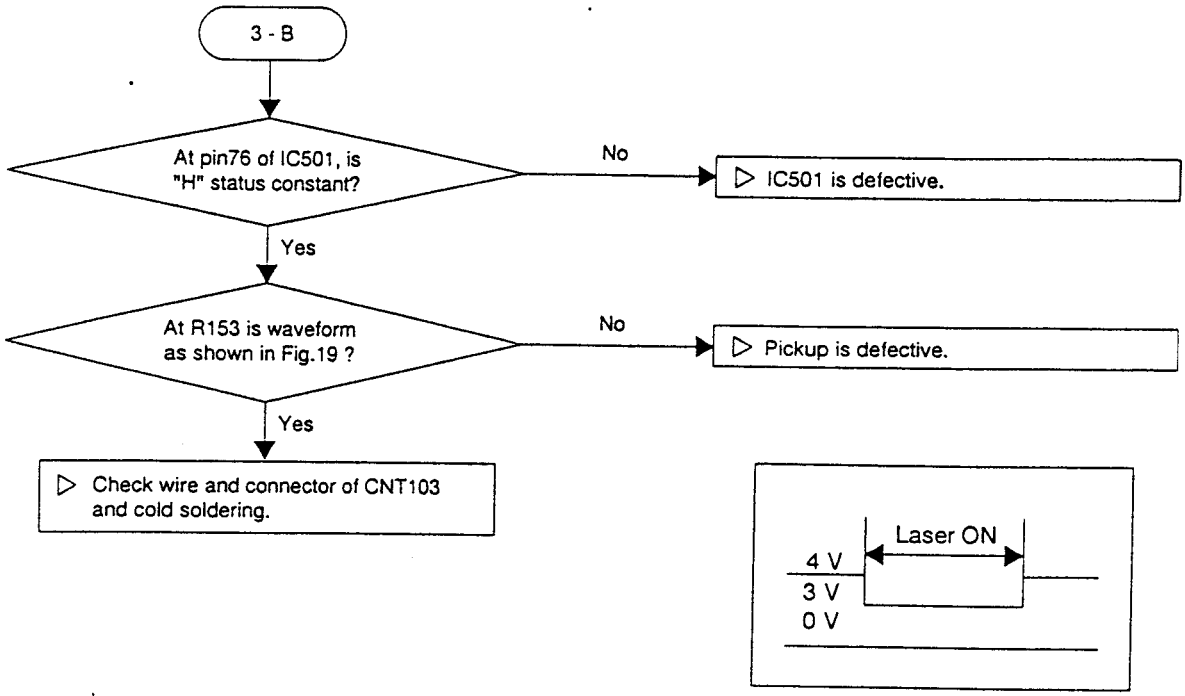


Fig. 19

[Repair item 3-C] Object lens of pickup unit does not move up and down.

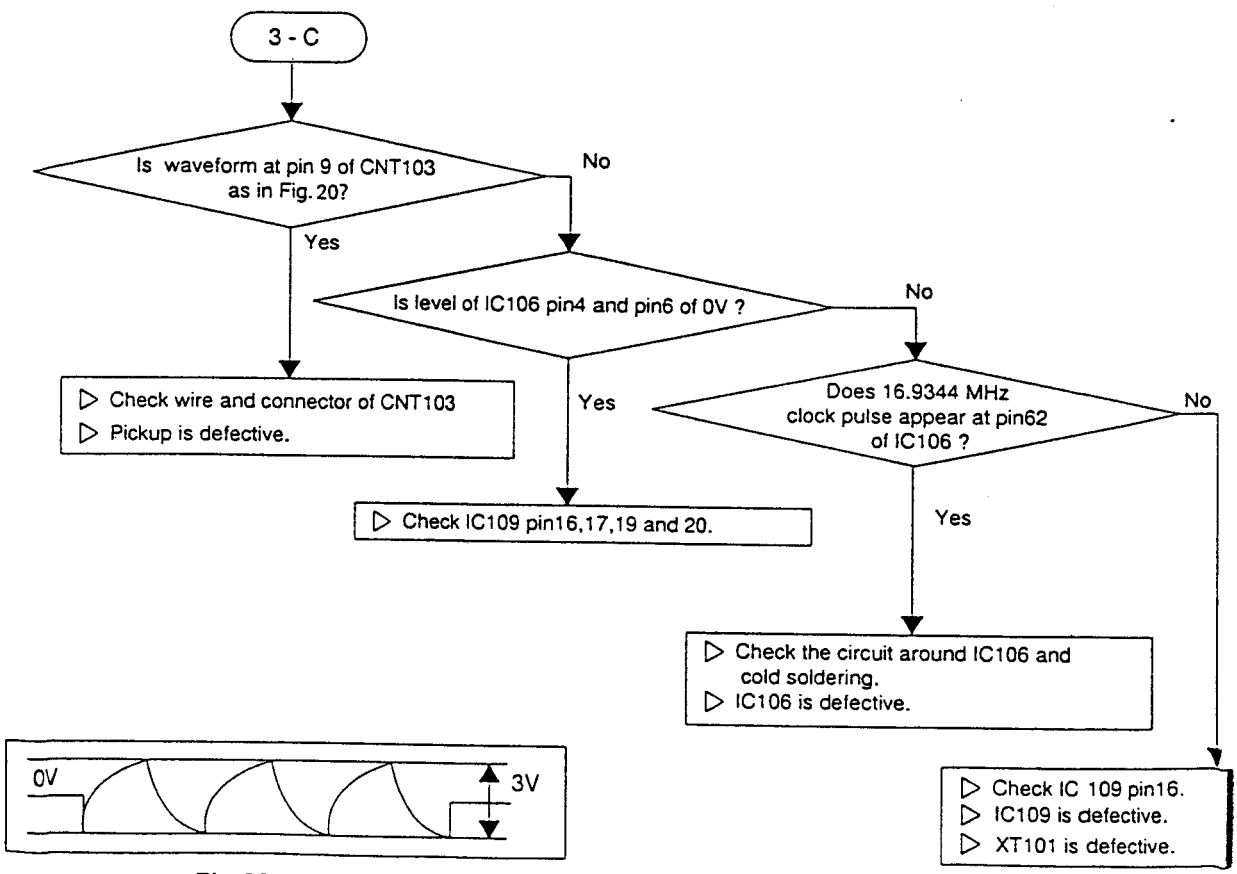
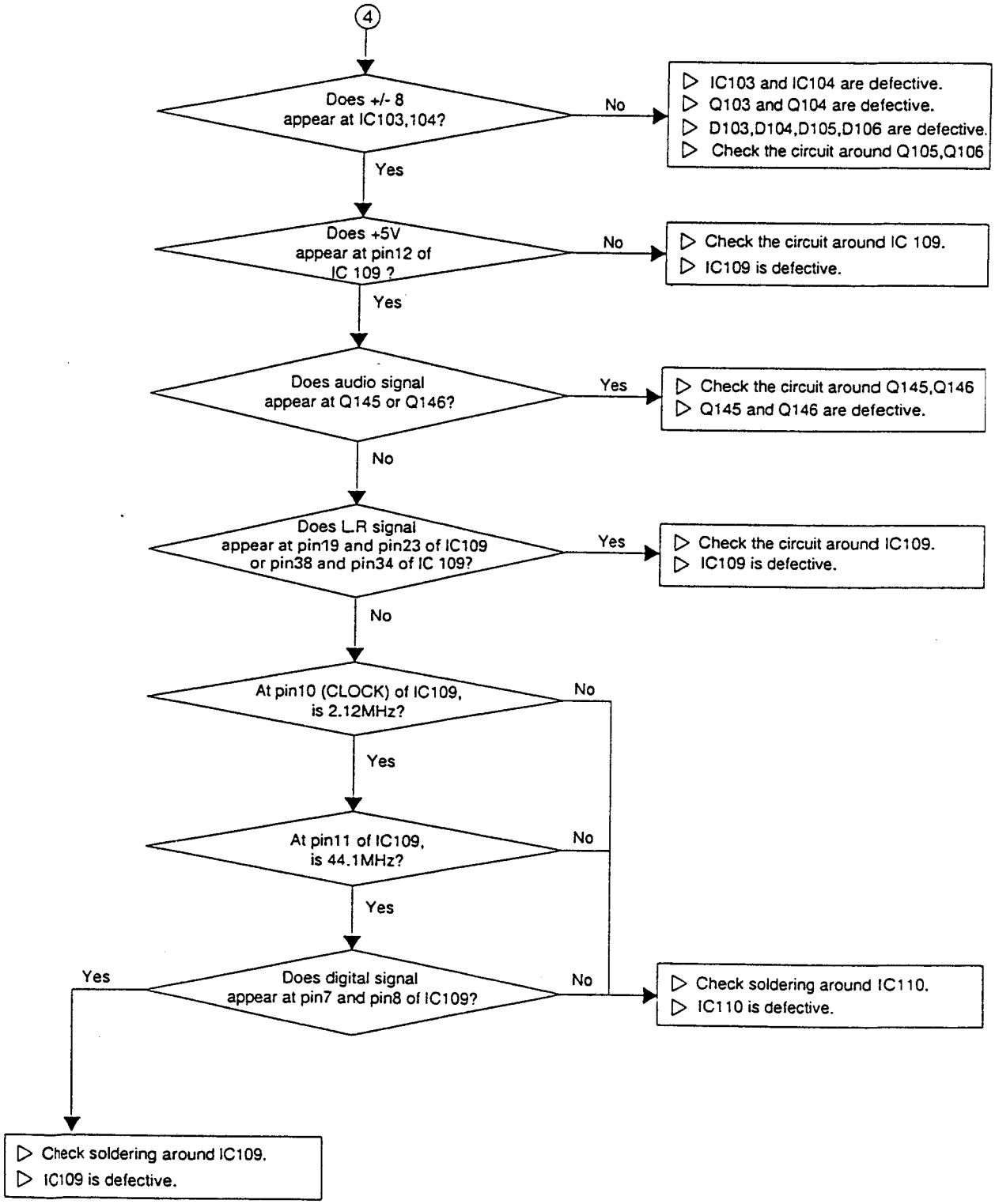
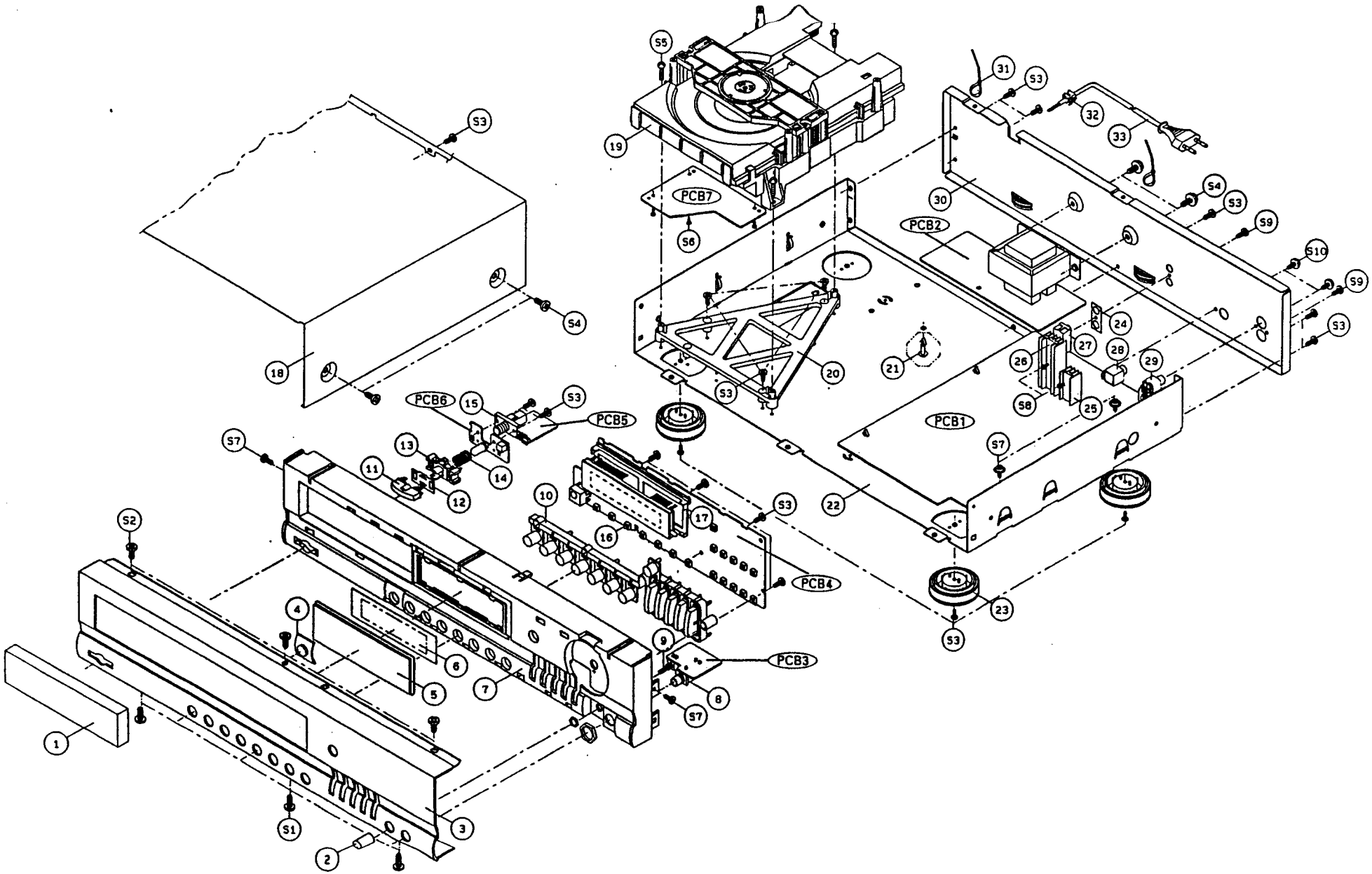

3 - C
Is waveform at pin 9 of CNT103 as in Fig. 20?
No
Yes
Is level of IC106 pin4 and pin6 of 0V ?
No
▷ Check wire and connector of CNT103
▷ Pickup is defective.
Yes
Does 16.9344 MHz clock pulse appear at pin62 of IC106 ?
No
▷ Check IC109 pin16,17,19 and 20.
Yes
▷ Check the circuit around IC106 and cold soldering.
▷ IC106 is defective.
▷ Check IC 109 pin16.
▷ IC109 is defective.
▷ XT101 is defective.
0V
3V

Fig.20

[Repair item 4] No sound signal.

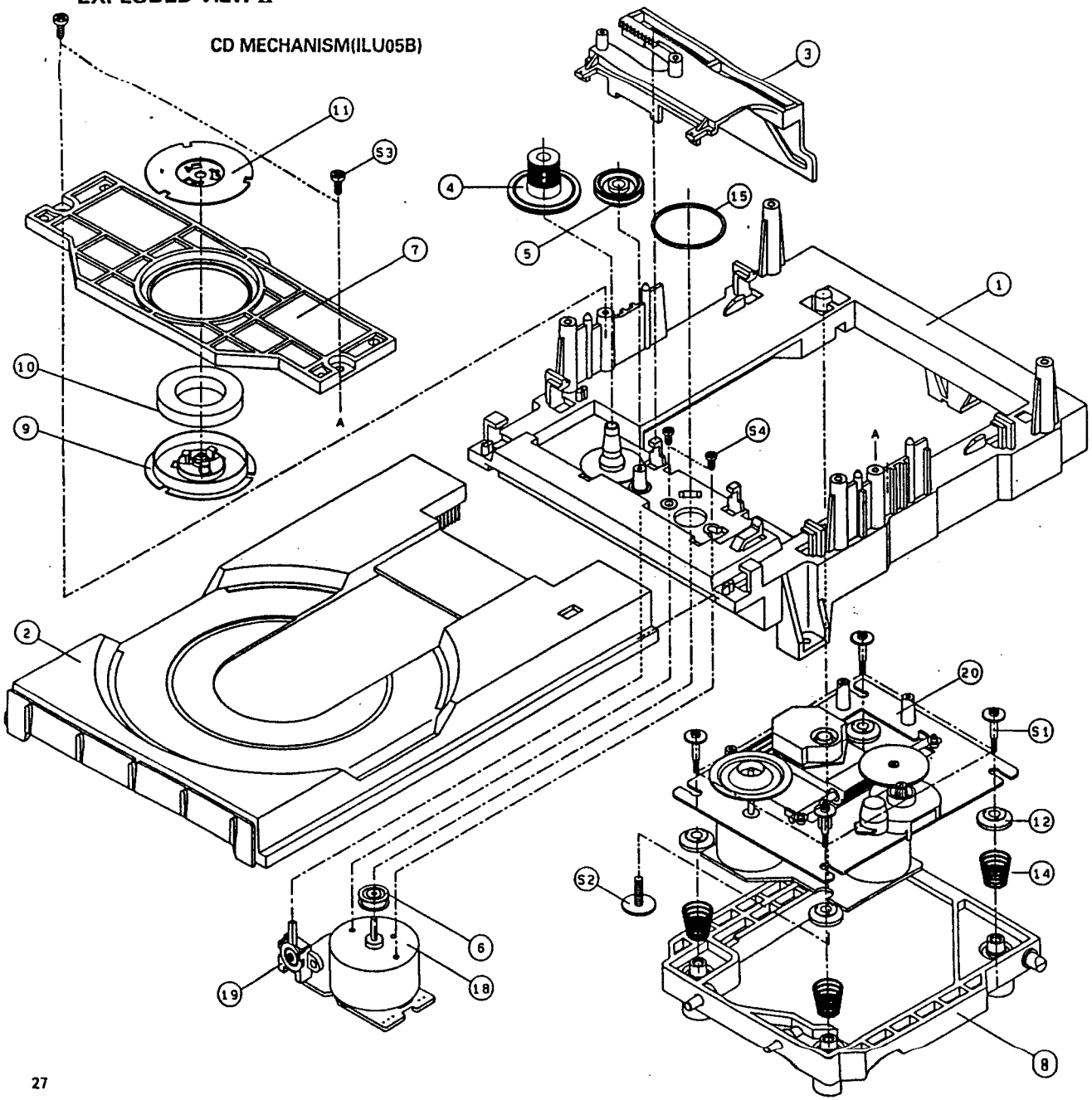

4
Does +/- 8 appear at IC103,104?
No
▷ IC103 and IC104 are defective.
▷ Q103 and Q104 are defective.
▷ D103,D104,D105,D106 are defective.
▷ Check the circuit around Q105,Q106
Yes
Does +5V appear at pin12 of IC 109 ?
No
▷ Check the circuit around IC 109.
▷ IC109 is defective.
Yes
Does audio signal appear at Q145 or Q146?
Yes
▷ Check the circuit around Q145,Q146
▷ Q145 and Q146 are defective.
No
Does L.R signal appear at pin19 and pin23 of IC109 or pin38 and pin34 of IC 109?
Yes
▷ Check the circuit around IC109.
▷ IC109 is defective.
No
At pin10 (CLOCK) of IC109, is 2.12MHz?
No
Yes
At pin11 of IC109, is 44.1MHz?
No
Yes
Yes
Does digital signal appear at pin7 and pin8 of IC109?
No
▷ Check soldering around IC110.
▷ IC110 is defective.
▷ Check soldering around IC109.
▷ IC109 is defective.

GENERAL UNIT EXPLODED VIEW I



EXPLODED VIEW II

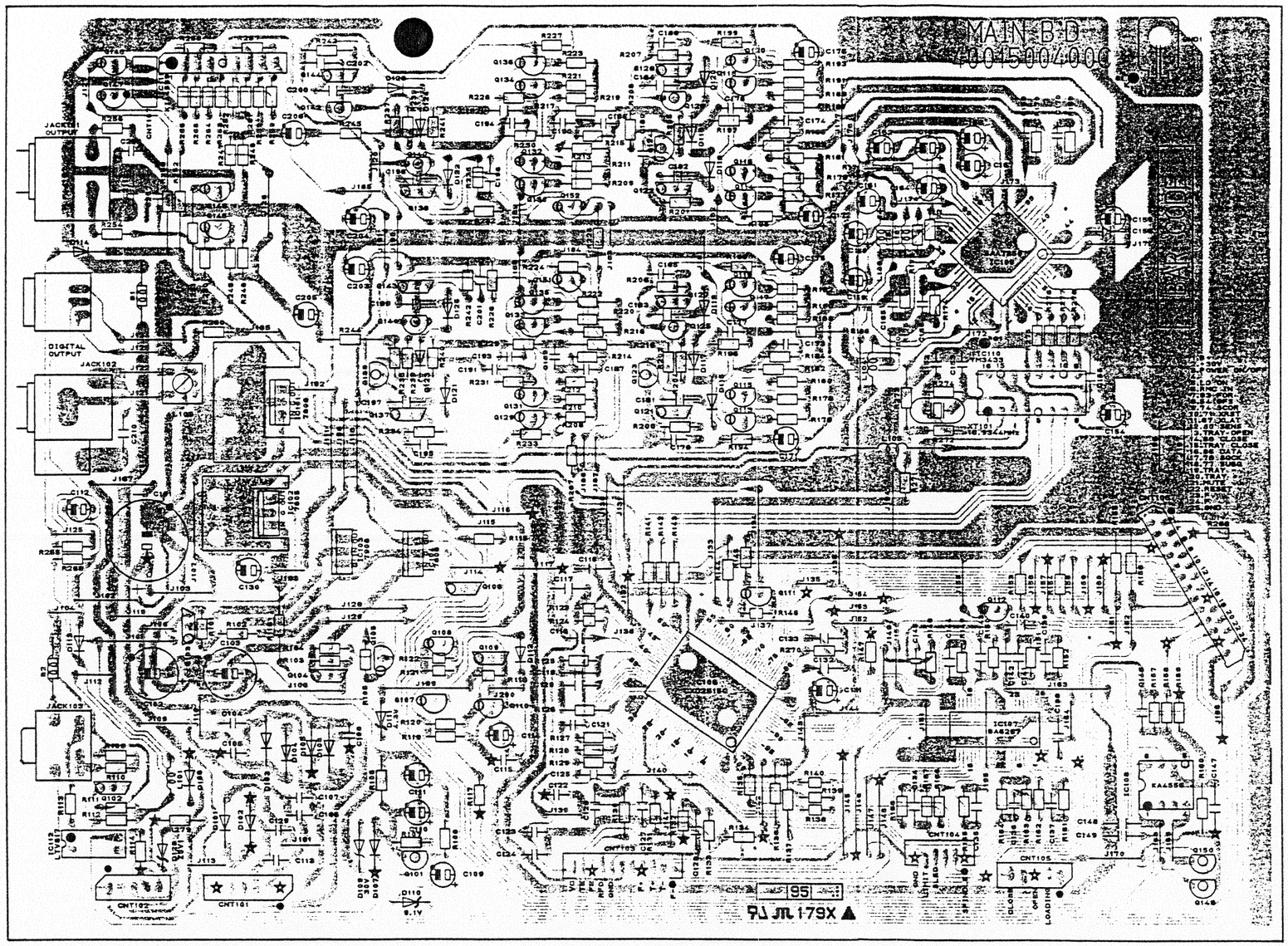
CD MECHANISM(ILU05B)



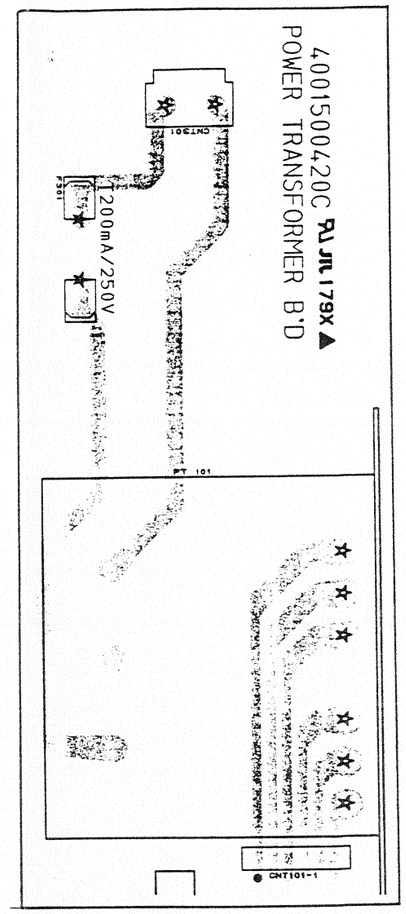
No.	Part No.	REV	Description	Q'ty	Remark
1	6021601220		BODY MECHA	1	
2	6021800330		TRAY DISC	1	
3	7142000420		CAM SLIDE	1	
4	7103001620		GEAR LOADING	1	
5	7103001810		GEAR PULLEY	1	
6	7113001310		PULLEY MOTOR	1	
7	6023601220		CHUCK FRAME	1	
8	6062000320		BASE DRIVE UNIT	1	A'ssy SHAFT
9	6063103010		BASE MAGNET	1	
10	5125000910		MAGNET	1	
11	6023408610		COVER MAGNET	1	
12	6715024510		RUBBER DAMPING	4	
13					
14	6555014010		SPRING DAMPING	4	
15	7165002620		BELT (ø24 × 1.1 × 1.2)	1	
16					
17					
18	5558001810		MOTOR RF 500TB-12560	1	
19	4638003210		S/W LEVER (SSCF-21)	1	KSM-2401ABM
20	5728001110		CD DRIVE UNIT	1	
Screws					
S1	8155001120		SCREW DAMPING	4	
S2	8155001210		SCREW MECHA	1	
S3	8159626081		SCREW #2WPT 2.6 × 8Y	2	
S4	8009126051		SCREW BM 2.6 × 5	2	

PRINTED CIRCUIT BOARDS

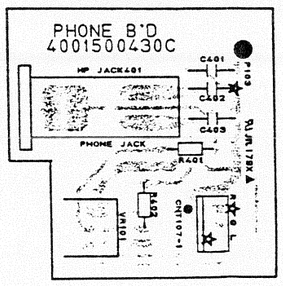
PCB 1 (MAIN)



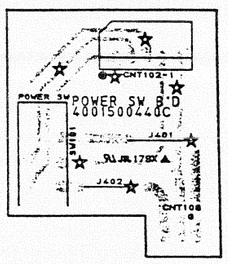
PCB 2 (POWER TRANS)



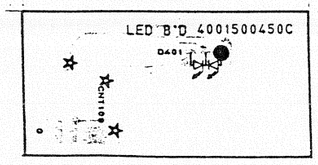
PCB 5 (POWER S/W)



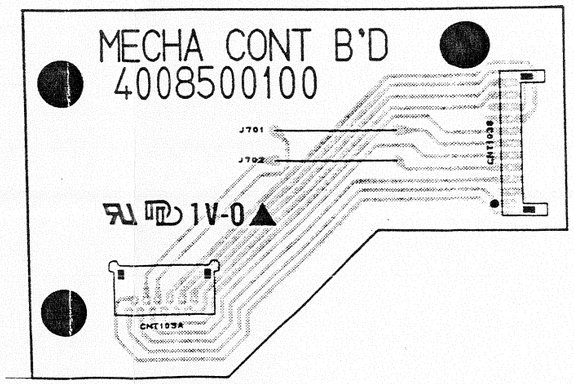
PCB 3 (PHONE)



PCB 6 (LED)



PCB 7 (MECHA CONTROL)



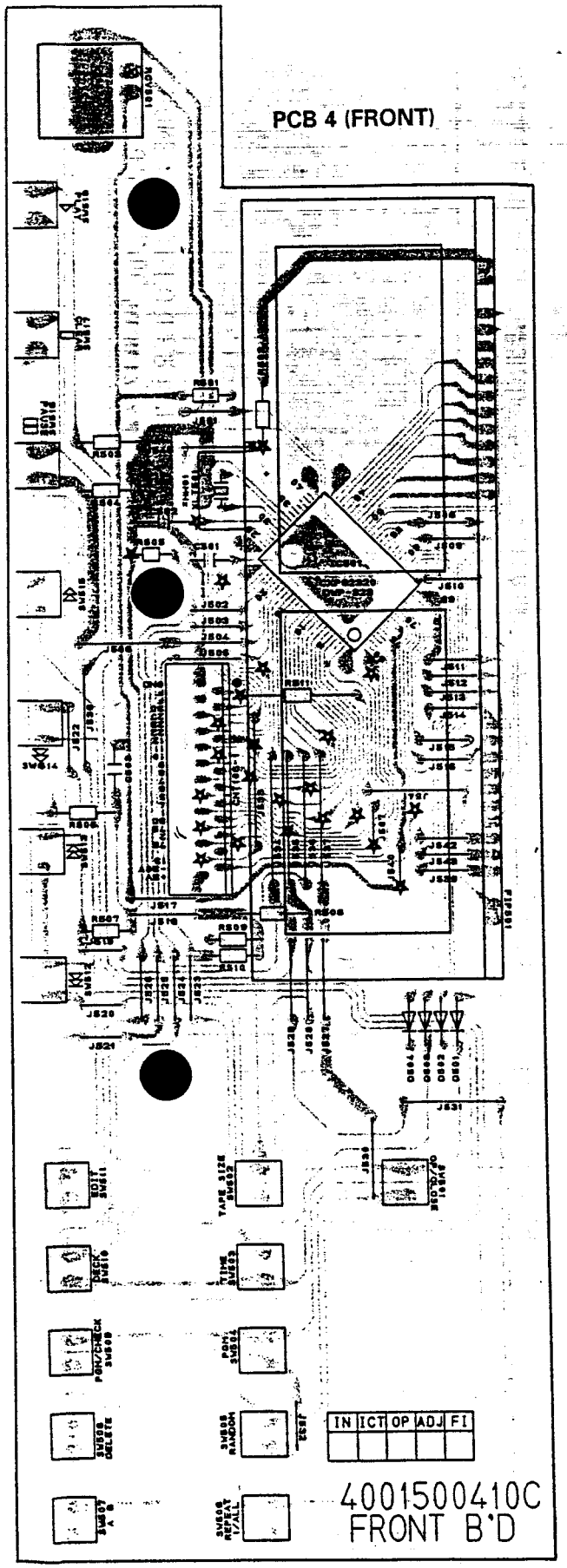
ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTICE : Products marked with ⚠ have special characteristics important to safety.
If you replace any of these components, read carefully the product safty notice in this manual.
Don't degrade the safety of the product through improper servicing.
Resistor/Capacitor tolerance – D : (±0.5%), J : (±5%), K : (±10%), M : (±20%), Z : +80, – 20%)

Ref. No.	Description					Mfr.Part No.	Q'ty
PCB1	ASS'Y,P.C.BOARD MAIN					054002009848	
	CAPACITORS						
C101	Electrolytic SG	4700	uF	16 V	M	3409347239	1
C102/C103	Electrolytic SG	1000	uF	25 V	M	3409310249	2
C104-C108	Mylar	0.047	uF	100 V	J	3679473120	5
C109-C111	Electrolytic SG	22	uF	50 V	M	3479322071	3
C112	Electrolytic SG	10	uF	50 V	M	3479310071	1
C113/C114	Mylar	0.047	uF	100 V	J	3679473120	2
C115	Electrolytic SG	10	uF	50 V	M	3479310071	1
C116	Mylar	0.022	uF	100 V	J	3679223120	1
C117	Mylar	0.01	uF	100 V	J	3679103120	1
C118	Mylar	0.68	uF	63 V	K	3679684297	1
C119	Ceramic Tubular	100	pF	50 V	J	3519101935	1
C120	Ceramic Tubular	4700	pF	16 V	K	3519472935	1
C121	Mylar	0.002	uF	100 V	J	3679152120	3
C122-C124	Mylar	0.68	uF	63 V	K	3679684297	1
C125	CeramicTubular	0.1	uF	50 V	Z	3519104935	1
C126	CeramicTubular	470	pF	50 V	J	3519471935	1
C127	Ceramic Tubular	0.022	uF	50 V	Z	3519223935	1
C128	CeramicTubular	470	pF	50 V	J	3519471935	1
C129	Mylar	0.047	uF	100 V	J	3679473120	1
C130	Electrolytic SG	10	uF	50 V	M	3479310071	1
C131	Electrolytic SG	100	uF	16 V	M	3479310131	1
C132/C133	Ceramic Tubular	0.022	uF	50 V	Z	3519223935	2
C134/C135	CeramicTubular	680	pF	50 V	J	3519681935	2
C136	Mylar	0.015	uF	100 V	J	3679153120	1
C137	Mylar	0.007	uF	100 V	J	3679682120	1
C138-C142	Ceramic Tubular	0.022	uF	50 V	Z	3519223935	5
C143/C144	CeramicTubular	680	pF	50 V	J	3519681935	2
C145	Mylar	0.33	uF	63 V	K	3679334297	1
C146/C147	CeramicTubular	470	pF	50 V	J	3519471935	2
C148/C149	Ceramic Tubular	0.022	uF	50 V	Z	3519223935	2
C152/C153	Ceramic Disc CH	22	pF	50 V	J	3528220210	1
C154	Electrolytic SG	100	uF	10 V	M	3479310121	2
C155/C156	Ceramic Tubular	0.022	uF	50 V	Z	3519223935	1
C157	Electrolytic SG	100	uF	10 V	M	3479310121	2
C159/C160	Electrolytic SG	47	uF	16 V	M	3479347031	2
C161/C162	Electrolytic SG	100	uF	10 V	M	3479310121	2
C163/C164	Electrolytic SG	47	uF	16 V	M	3479347031	2
C165/C166	Ceramic Tubular	100	pF	50 V	J	3519101935	2
C167/C168	Electrolytic SG	47	uF	16 V	M	3479347031	2
C169/C170	Ceramic Tubular	100	pF	50 V	J	3519101935	2
C171/C172	Electrolytic SG	100	uF	16 V	M	3479310131	2
C173/C174	Ceramic Tubular	100	pF	50 V	J	3519101935	2
C175/C175	Electrolytic SG	100	uF	16 V	M	3479310131	2
C177/C178	Ceramic Tubular	100	pF	50 V	J	3519101935	2
C179/C180	CeramicTubular	220	pF	50 V	J	3519221935	2
C181-C184	Ceramic Tubular	10	pF	50 V	J	3519100935	4
C185/C186	CeramicTubular	220	pF	50 V	J	3519221935	2
C187/C188	Mylar	0.006	uF	100 V	J	3679562120	2
C189/C190	Mylar	0.033	uF	100 V	J	3679333120	2
C191/C192	Ceramic Tubular	150	pF	50 V	J	3519151935	2
C193/C194	Mylar	0.001	uF	100 V	J	3679122120	2
C195/C196	CeramicTubular	47	pF	50 V	J	3519470935	2
C197-C200	Ceramic Tubular	10	pF	50 V	J	3519100935	4
C201/C202	CeramicTubular	47	pF	50 V	J	3519470935	2
C203/C204	Electrolytic SG	100	uF	16 V	M	3479310131	2
C205/C206	Electrolytic SG	10	uF	50 V	M	3479310071	2
C207/C208	Mylar	0.004	uF	100 V	J	3679392120	2
C210	CeramicTubular	68	pF	50 V	J	3519680935	1
C211	CeramicTubular	0.047	uF	50 V	J	3519473935	1
	CONNECTORS						
CNT101	Wafer, 6P					4428505810	1
CNT102	Wafer, 5P					4428506910	1
CNT103	Wafer, 11P					4428517010	1
CNT104	Wafer, 6P					4428516510	1
CNT105	Wafer, 5P					4428506910	1
CNT106	Wafer, FPC, 25P					4426001025	1
CNT107	Wafer, 3P					4428505710	1
	DIODES						
D101-D107	IN4002, Rectifier					2258100135	7
D109	Zener, UZ 30.0 BSD					2258599128	1
D110	Zener, UZ 9.1 BSC					2258599107	1
D111	Zener, UZ 4.3 BSB					2258599102	1
D112-D216	1N4148, Switching					2258322101	5
D128	Zener, UZ 5.1 BSB					2258599103	1
	INTEGRATED CIRCUITS						
IC101	KA7808, Regulator					2168602101	1
IC102	KA7805, Regulator					2168602105	1
IC103	KA7908, Regulator					2168602102	1
IC104	KA7808, Regulator					2168602101	1
IC106	CXD2515Q					2138022116	1
IC107	BA6297AFP					2168027202	1
IC108	KA4558					2168000114	1
IC109	SAA7350GP/M3					2138000194	1
IC110	YM3433					2138000149	1
IC111	KIA4559S/KIA75559S, OP Amp					2168206103	1
IC112	LTV-817, Optocoupler					2408000136	1

Ref. No.	Description	Mfr.Part No.	Q'ty
	COILS		
L101	Inductor, 10 uH	2648610082	1
L103	Coil, Matching Trans	2638710020	1
L104	Inductor, 100 uH	2648610182	1
L105-L107	Inductor, 10 uH	2648610082	3
	TRANSISTORS		
Q101	MPSA56Y, PNP, Silicon	2208206113	1
Q102	DTA114YS, PNP, Silicon	2208222105	1
Q103	BKTC2235/KTC1027Y, PNP, Silicon	2228406120	1
Q104	KTA1023Y/BKTA965, PNP, Silicon	2228106107	1
Q105	BKTA1266Y/KTA1015Y, PNP, Silicon	2208206105	1
Q106	DTC114YS, NPN, Silicon	2208622106	1
Q107	KTD1302S, NPN, Silicon	2208606112	1
Q108	BKTA1266Y/KTA1015Y, PNP, Silicon	2208206105	1
Q109	DTC114YS, NPN, Silicon	2208622106	1
Q110	KTD1302S, NPN, Silicon	2208606112	1
Q111	BKTA1266Y/KTA1015Y, PNP, Silicon	2208206105	1
Q112	KTD1302S, NPN, Silicon	2208606112	1
Q113-Q11	KTA1268/KTA970, PNP, Silicon	2208206104	4
Q117-Q12	BKTC3200/KTC2240BL, NPN, Silicon	2208606108	4
Q121/Q12	BKTC2235/KTC1027Y, PNP, Silicon	2228406120	2
Q123/Q12	MPSA56Y, PNP, Silicon	2208206113	2
Q125/Q12	MPSA06Y, NPN, Silicon	2208606114	2
Q127/Q12	KTA1023Y/BKTA965, PNP, Silicon	2228106107	2
Q129-Q13	KTA1268/KTA970, PNP, Silicon	2208206104	4
Q133-Q13	BKTC3200/KTC2240BL, NPN, Silicon	2208606108	4
Q137/Q13	BKTC2235/KTC1027Y, PNP, Silicon	2228406120	2
Q139/Q14	MPSA56Y, PNP, Silicon	2208206113	2
Q141/Q41	MPSA06Y, NPN, Silicon	2208606114	2
Q143/Q14	KTA1023Y/BKTA965, PNP, Silicon	2228106107	2
Q145-Q14	KTD1302S, NPN, Silicon	2208606112	4
Q149	MPSA06Y, NPN, Silicon	2208606114	1
Q150	MPSA56Y, PNP, Silicon	2208206113	1
Q151/Q15	KTD1302S, NPN, Silicon	2208606112	2

	RESISTORS						
R101	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R102	Metal Film	2.2	kohm	1/5 W	J	3029222970	1
R103	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R104	Metal Film	2.2	kohm	1/5 W	J	3029222970	1
R105	Carbon Film	47	kohm	1/5 W	J	3069473970	1
R106	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R107/R108	Metal Film	4.7	kohm	1/5 W	J	3029472970	2
R109	Carbon Film	47	kohm	1/5 W	J	3069473970	1
R110	Metal Film	47	ohm	1/5 W	J	3029470970	1
R111	Metal Film	100	ohm	1/5 W	J	3029101970	1
R112	Metal Film	3.9	kohm	1/5 W	J	3029392970	1
R113	Metal Film	270	ohm	1/5 W	J	3029271970	1
R114	Metal Film	120	ohm	1/5 W	J	3029121970	1
R115	Metal Film	3.3	kohm	1/5 W	J	3029332970	1
R116	Metal Film	1	kohm	1/5 W	J	3029102970	1
R117	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R118	Metal Film	1	kohm	1/5 W	J	3029102970	1
R119	Carbon Film	47	kohm	1/5 W	J	3069473970	1
R120	Metal Film	1	kohm	1/5 W	J	3029102970	1
R121	Metal Film	3.3	kohm	1/5 W	J	3029332970	1
R122	Carbon Film	15	kohm	1/5 W	J	3069153970	1
R123	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R124	Carbon Film	100	kohm	1/5 W	J	3069104970	1
R125	Carbon Film	1	Mohm	1/5 W	J	3069105970	1
R126	Metal Film	100	ohm	1/5 W	J	3029101970	1
R127/R128	Metal Film	3.3	kohm	1/5 W	J	3029332970	2
R129	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R130	Carbon Film	15	kohm	1/5 W	J	3069153970	1
R131	Carbon Film	100	kohm	1/5 W	J	3069104970	1
R132	Carbon Film	15	kohm	1/5 W	J	3069153970	1
R133	Carbon Film	33	kohm	1/5 W	J	3069333970	1
R134	Carbon Film	100	kohm	1/5 W	J	3069104970	1
R135	Carbon Film	15	kohm	1/5 W	J	3069153970	1
R136	Carbon Film	33	kohm	1/5 W	J	3069333970	1
R137	Carbon Film	12	kohm	1/5 W	J	3069123970	1
R138-R140	Carbon Film	15	kohm	1/5 W	J	3069153970	3
R141-R143	Metal Film	680	ohm	1/5 W	J	3029681970	3
R144	Metal Film	1	kohm	1/5 W	J	3029102970	1
R145/R146	Carbon Film	10	kohm	1/5 W	J	3069103970	2
R147	Metal Film	1	kohm	1/5 W	J	3029102970	1
R148	Metal Film	4.7	ohm	1/5 W	J	3029479970	1
R149-R152	Carbon Film	7.5	kohm	1/5 W	J	3069753970	3
R153	Metal Film	1	kohm	1/5 W	J	3029103970	1
R154	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R155/R156	Carbon Film	33	kohm	1/5 W	J	3069333970	2
R157-R160	Carbon Film	100	kohm	1/5 W	J	3069104970	4
R161	Carbon Film	68	kohm	1/5 W	J	3069683970	1
R162	Carbon Film	22	kohm	1/5 W	J	3069223970	1
R163/R164	Carbon Film	68	kohm	1/5 W	J	3069683970	2
R165	Carbon Film	7.5	kohm	1/5 W	J	3069753970	1
R166	Carbon Film	15	kohm	1/5 W	J	3069153970	1
R167	Carbon Film	7.5	kohm	1/5 W	J	3069823970	1
R168	Carbon Film	15	kohm	1/5 W	J	3069153970	1
R169/R170	Carbon Film	27	kohm	1/5 W	J	3069273970	2
R171	Carbon Film	22	kohm	1/5 W	J	3069223970	1



GENERAL UNIT PARTS LIST

Ref. No.	Description	Mfr.Part No.	Q'ty
	CABINET & CHASSIS		
1	Door Tray, ABS, Black	048563007611	1
2	Knob, Volume, ABS, Black	048545130911	1
3	Panel, Front	048602019711	1
4	Window, Remote	8555052410	1
5	Window, Display	8553023310	1
6	Filter, FL	048555052311	1
7	Body Front, ABS, Black	8521009410	1
8	Jack, Phone	4438005010	1
9	Volume, Phone, RK0971220A0112C R0898	3228015910	1
10	Button, Tact 18key, ABS, Black	048542007911	1
11	Button, Power, ABS, Black	048545130811	1
12	Light Shield, Black	8535076020	1
13	Indicator, Power	8555052110	1
14	Spring, Power	6555010720	1
15	Switch Push, Power	4628058310	1
16	Switch Tact	4658003710	18
17	Holder, FL, ABS, Black	8543089710	1
18	Cover Top	6122030020	1
19	Ass'y CD Mecha, ILU05B	5728000720	1
20	Base, Mecha, ABS, Black	6703002910	1
21	Fastener	6528301710	4
22	Chassis, Main	6121614710	1
23	Foot, ABS, Gold	046033102511	4
24	Cover Plate	8535046310	1
25	Heatsink Regulator TR.	7505206210	1
26	Heatsink Regulator TR.	7505206130	1
27	Jack, Remote	4438007520	1
28	Jack, RCA 1P	4438111020	1
29	Jack, RCA 2P	4438111310	1
30	Chassis, Back	046102044121	1
31	Cable Tie	6528000410	1
32	Holder, Stopper	6518002310	1
33	⚠ Cord, AC Power	4308009510	1
	HARDWARE KIT		
S1	Screw, #2FTC 3x12B	8129230123	3
S2	Screw, #2FTC 3x8B	8129230083	3
S3	Screw, #2BTC 3x8B	8109230083	21
S4	Screw, WSAM 4x8B	8159440083	6
S5	Screw, #2BTC 3x14Y	8109230141	3
S6	Screw, #2PTC 2.6x6Y	8119226061	3
S7	Screw, #2WPTC 3x6Y	8159230061	4
S8	Screw, #2BTC 3x6B	8109230063	2
S9	Screw, #1PT 3x10B	8119130103	2
S10	Screw, Ground	8155007710	2
	MISCELLANEOUS		
	Card Cable, 25P, 160mm, Front B'D to Main B'D	4118625165	1
	Card Cable, 12P, 100mm, Mecha to Mecha Control	4118512100	1
	WIRE ASS'Y 6P,160mm, 2mm, Mecha to Main B'D	436206162092	1
	WIRE ASS'Y 11P,160mm, 2mm, Mecha to Main B'	436211162092	1
	WIRE ASS'Y 5P,600mm, 2.5mm, LED B'D to Main	436105603021	1

PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual. Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

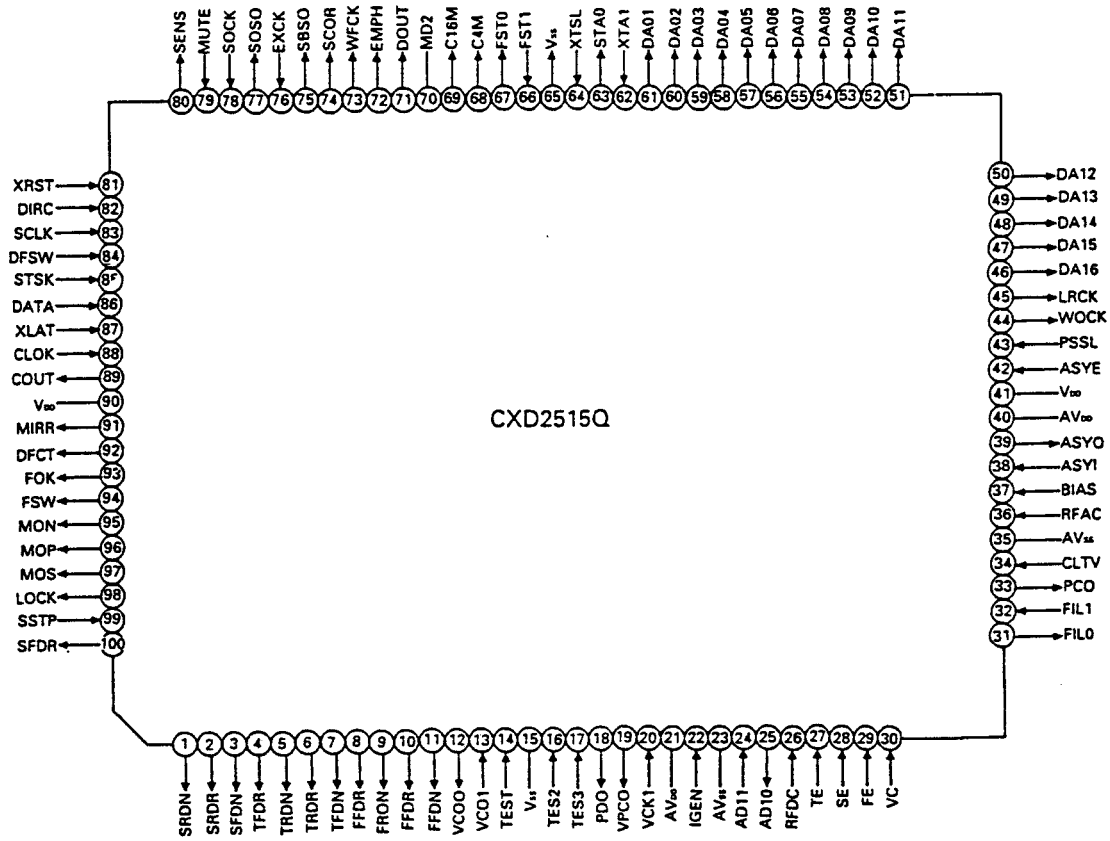
Ref. No.	Description					Mfr.Part No.	Q'ty
R172/R173	Metal Film	100	ohm	1/5 W	J	3029101970	2
R174/R175	Carbon Film	27	kohm	1/5 W	J	3069273970	2
R176/R179	Metal Film	10	ohm	1/5 W	J	3029100970	2
R180/R181	Carbon Film	12	kohm	1/5 W	J	3069123970	2
R182-R187	Carbon Film	20	kohm	1/5 W	J	3069203970	6
R188/R189	Carbon Film	12	kohm	1/5 W	J	3069123970	2
R190-R193	Metal Film	10	ohm	1/5 W	J	3029100970	4
R194/R195	Metal Film	2.7	kohm	1/5 W	J	3029272970	2
R196/R197	Carbon Film	20	kohm	1/5 W	J	3069203970	2
R198/R199	Metal Film	2.7	kohm	1/5 W	J	3029272970	2
R200/R201	Metal Film	180	ohm	1/5 W	J	3029181970	2
R202-R205	Metal Film	47	ohm	1/5 W	J	3029470970	4
R206/R207	Metal Film	180	ohm	1/5 W	J	3029181970	2
R208-R211	Metal Film	39	ohm	1/5 W	J	3029390970	4
R212/R213	Carbon Film	12	kohm	1/5 W	J	3069123970	2
R214/R215	Metal Film	390	ohm	1/5 W	J	3029391970	2
R216/R217	Metal Film	1.2	kohm	1/5 W	J	3029122970	2
R218/R219	Carbon Film	12	kohm	1/5 W	J	3069123970	2
R220-R223	Metal Film	39	ohm	1/5 W	J	3029390970	4
R224/R225	Carbon Film	5.6	kohm	1/5 W	J	3069562970	2
R226/R227	Carbon Film	3.6	kohm	1/5 W	J	3069362970	2
R228	Carbon Film	5.1	kohm	1/5 W	J	3069512970	1
R229/R230	Carbon Film	18	kohm	1/5 W	J	3069183970	2
R231	Carbon Film	5.1	kohm	1/5 W	J	3069512970	1
R232/R233	Carbon Film	3.6	kohm	1/5 W	J	3069362970	2
R234/R235	Metal Film	82	ohm	1/5 W	J	3029820970	2
R236-R239	Metal Film	33	ohm	1/5 W	J	3029330970	3
R240/R241	Carbon Film	27	kohm	1/5 W	J	3069273970	2
R242/R243	Metal Film	82	ohm	1/5 W	J	3029820970	2
R244-R247	Metal Film	100	ohm	1/5 W	J	3029101970	4
R248/R249	Carbon Film	10	kohm	1/5 W	J	3069103970	2
R250-R253	Metal Film	1	kohm	1/5 W	J	3029102970	4
R254	Metal Film	100	ohm	1/5 W	J	3029101970	1
R255	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R256	Metal Film	100	ohm	1/5 W	J	3029101970	1
R257/R258	Carbon Film	10	kohm	1/5 W	J	3069103970	2
R259	Metal Film	22	ohm	1/5 W	J	3029220970	1
R260	Metal Film	4.7	kohm	1/5 W	J	3029472970	1
R261	Metal Film	2.7	kohm	1/5 W	J	3029272970	1
R262	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R263	Metal Film	4.7	kohm	1/5 W	J	3029472970	1
R264	Carbon Film	10	kohm	1/5 W	J	3069103970	1
R265	Metal Film	2.7	kohm	1/5 W	J	3029272970	1
R266	Metal Film	22	ohm	1/5 W	J	3029220970	1
R267	Metal Film	56	kohm	1/5 W	J	3029563970	1
R268	Metal Film	1	kohm	1/5 W	J	3029102970	1
R269	Carbon Film	100	kohm	1/5 W	J	3069104970	1
R270	Metal Film	1	kohm	1/5 W	J	3029102970	1
R271	Metal Film	680	ohm	1/5 W	J	3029681970	1
R272	Metal Film	10	ohm	1/5 W	J	3029100970	1
R273	Metal Film	680	ohm	1/5 W	J	3029681970	1
R274	Carbon Film	1	Mohm	1/5 W	J	3069105970	1
R275-R278	Metal Film	680	ohm	1/5 W	J	3029681970	4
R279	Metal Film	150	ohm	1/5 W	J	3029151470	1
R280	Metal Film	1	kohm	1/5 W	J	3029102970	1
	MISCELLANEOUS						
25	Heatsink Regulator TR.					7505206210	1
26	Heatsink Regulator TR.					7505206130	1
27	Jack, Remote					4438007520	1
28	Jack, RCA 1P					4438111020	1
29	Jack, RCA 2P					4438111310	1
XT101	Crystal, 16.9344 MHz					3938101500	1
GND1	Terminal, Ground					4235007310	1
B1/B2	Bead Core, 3580					2648702130	2
PCB2	ASS'Y P.C.BOARD POWER TRANS					054002009852	
CNT301	Wafer, AC, 1P					4428100291	1
CNT101-1	CNT ASS'Y 6P 2.5mm					436106103321	1
⚠ F301	T 200 mA, 250 V					5508301135	1
⚠ PT101	Power Transformer, 230 V, 50 Hz					2828100837	1
	Clip, Fuse					4255001010	2
PCB3	ASS'Y P.C.BOARD PHONE					054002009857	
C401	Ceramic Tubular	0.022	uF	50 V	Z	3519223935	1
C402/C403	Ceramic Tubular	4700	pF	16 V	K	3519472935	2
CNT107-1	Lead Ass'y, 3P, 300mm					436103303131	1
R401/R402	Metal Film	56	ohm	1/5 W	J	3029560970	2
8	Jack, Phone					4438005010	1
9	Volume, Phone, RK0971220A0112C R0B98					3228015910	1
PCB4	ASS'Y P.C.BOARD FRONT					054002009850	
C501-C503	Ceramic Tubular	0.022	uF	50 V	Z	3519223935	3
CNT106-1	CNT PLUG 52575-2530					4428525826	1
D501-D504	1N4148, Switching					2258322101	4
IC501	CXP82320-333Q, DWP323					2138322196	1
R501	Carbon Film	33	kohm	1/5 W	J	3069333970	1
R502	Carbon Film	2.2	ohm	1/5 W	J	3069229970	1
R503-R510	Carbon Film	33	kohm	1/5 W	J	3069333970	8
R511	Carbon Film	2.2	ohm	1/5 W	J	3069229970	1
XLT501	Resonator, CST10 MHz					3938131750	1
FIP501	FIP, 10CBM8					2328130313	1
RCV501	Remote Sensor, KRM-34LI					2408000131	1
16	Switch Tact					4658003710	18
17	Holder, FL, ABS, Black					8543069710	1

Ref. No.	Description	Mfr.Part No.	Q'ty
PCB5	ASS'Y P.C.BOARD POWER SWITCH	054002009855	
CNT108	Wafer, 3P	4428851103	1
CNT102-1	Wafer, 5P	4428513450	1
15	Switch Push, Power	4628058310	1
PCB6	ASS'Y P.C.BOARD LED	054002009854	
D401	LED, SPR-54MDW3 Green/Amber	2308222205	1
CNT109	Wafer, 3P	4428861003	1
PCB7	ASS'Y P.C.BOARD MECHA CONTROL	054002009860	
CNT103A	CNT PLUG 6200-127 FPC DIP	4428527170	1
CNT103B	Wafer, 11P	4428525610	1

IC'S LEAD IDENTIFICATION & BLOCK DIAGRAMS

IC106 : CXD2515Q (Digital signal processor with CD digital servo)

1. Pin Configuration



2. Pin Function

Pin No.	Symbol	I/O	Description
1	SRON	O	Sled drive output
2	SRDR	O	Sled drive output
3	SFON	O	Sled drive output
4	TFDR	O	Tracking drive output
5	TRON	O	Tracking drive output
6	TRDR	O	Tracking drive output
7	TFON	O	Tracking drive output
8	FFDR	O	Focus drive output
9	FRON	O	Focus drive output
10	FRDR	O	Focus drive output
11	FFON	O	Focus drive output
12	VCOO	O	Analog EFM PLL oscillator circuit output
13	VCOI	I	Analog EFM PLL oscillator circuit input (LOCK=8.6436MHz)
14	TEST	I	Test pin, normally GND
15	Vss	–	Digital GND

Pin No.	Symbol	I/O	Description
16	TES2	I	Test pin, normally GND
17	TES3	I	Test pin, normally GND
18	PDO	O	Charge pump output for analog EFM PLL
19	VPCO	O	PLL charge pump output for variable pitch
20	VCKI	I	Clock input from external VCO for variable pitch fcenter=16.9344MHz
21	AV_{DD}	—	Analog power supply
22	IGEN	I	Current source reference resistance connector for OP amp.
23	AV_{SS}	—	Analog GND
24	ADII	I	A/D converter input
25	ADIO	O	OP amp. output
26	RFDC	I	RF signal input. Input range 2.15 to 5.0V (when V_{DD}=AV_{DD}=5.0V)
27	TE	I	Tracking error signal input. Input range 2.5V±1.0V (when V_{DD}=AV_{DD}=5.0V)
28	SE	I	Sled error signal input. Input range 2.5V±1.0V (when V_{DD}=AV_{DD}=5.0V)
29	FE	I	Focus error signal input. Input range 2.5V±1.0V (when V_{DD}=AV_{DD}=5.0V)
30	VC	I	Center voltage input
31	FILO	O	Master PLL filter output
32	FILI	I	Master PLL filter input
33	PCO	O	Master PLL charge pump output
34	CLTV	I	Master VCO control voltage input
35	AV_{SS}	—	Analog GND
36	RFAC	I	EFM signal input
37	BIAS	I	Asymmetry circuit constant current input
38	ASYI	I	Asymmetry comparator voltage input
39	ASYO	O	EFM full-swing output (Low=Vss, High=V_{DD}
40	AV_{DD}	—	Analog power supply
41	V_{DD}	—	Digital power supply
42	ASYE	I	Asymmetry circuit ON/OFF (Low=OFF; High=ON)
43	PSSL	I	Audio data ouput mode switching input. Low for serial output; High for parallel output
44	WDCK	O	48-bit slot D/A interface. Word clock f=Fs
45	LRCK	O	48-bit slot D/A interface. LR clock f=2Fs
46	DA16	O	DA16 output when PSSL=1. 48-bit slot serial data when PSSL=0.
47	DA15	O	DA15 output when PSSL=1. 48-bit slot bit clock when PSSL=0.
48	DA14	O	DA14 output when PSSL=1. 64-bit slot serial data when PSSL=0.
49	DA13	O	DA13 output when PSSL=1. 64-bit slot bit clock when PSSL=0.
50	DA12	O	DA12 output when PSSL=1. 64-bit slot LR clock when PSSL=0.
51	DA11	O	DA11 output when PSSL=1. GTOP output when PSSL=0.
52	DA10	O	DA10 output when PSSL=1. XUGF output when PSSL=0.

Pin No.	Symbol	I/O	Description
53	DA09	O	DA09 ouput when PSSL=1. XPLCK output when PSSL=0.
54	DA08	O	DA08 ouput when PSSL=1. GFS output when PSSL=0.
55	DA07	O	DA07 ouput when PSSL=1. RFCK output when PSSL=0.
56	DA06	O	DA06 ouput when PSSL=1. C2PO output when PSSL=0.
57	DA05	O	DA05 ouput when PSSL=1. XRAOF output when PSSL=0.
58	DA04	O	DA04 ouput when PSSL=1. MNT3 output when PSSL=0.
59	DA03	O	DA03 ouput when PSSL=1. MNT2 output when PSSL=0.
60	DA02	O	DA02 ouput when PSSL=1. MNT1 output when PSSL=0.
61	DA01	O	DA01 ouput when PSSL=1. MNT0 output when PSSL=0.
62	XTAI	I	Crystal oscillator circuit input. 16.9344 MHz or 33.8688MHz input.
63	XTA0	O	Crystal oscillator circuit output.
64	XTSL	I	Crystal selection input. Low for 16.9344MHz crystal; High for 33.8688MHz crystal.
65	V_{SS}	—	Digital GND
66	FSTI	I	2/3 frequency divider input of Pins 62 and 63
67	FSTO	O	2/3 frequency divider output of Pins 62 and 63. Does not change with variable pitch.
68	C4M	O	4.2336MHz output. Changes simultaneously when variable pitched.
69	C16M	O	16.9344MHz output. Changes simultaneously when variable pitched.
70	MD2	I	Digital Out ON/OFF control (Low=OFF, High=ON).
71	DOUT	O	Digital Out output.
72	EMPH	O	Playback disc emphasis mode output (Low for no emphasis applied; High for emphasis applied).
73	WFCK	O	WFCK output.
74	SCOR	O	Subcode sync ouput (High for subcode sync S0 or S1 detected).
75	SBSO	O	SubP to W serial output.
76	EXCK	I	SBSO readout clock input.
77	SQSO	O	SubQ 80-bit output : PCM peak data and level data 16-bit output.
78	SQCK	I	SQSO readout clock input.
79	MUTE	I	Mute switching input (High for mute).
80	SENS	O	SENS output (Output to CPU).
81	XRST	I	System reset (Low for reset).
82	DIRC	I	Used when 1 track jumped.
83	SCLK	I	SENS serial data read clock.
84	DFSW	I	DFCT switching input (High for defect prvention circuit turned OFF).
85	ATSK	I	Anti-shock input.
86	DATA	I	Serial data input from CPU.
87	XLAT	I	Latch input from CPU.
88	CLOK	I	Serial data transfer clock input from CPU.
89	COUT	O	Track count signal output

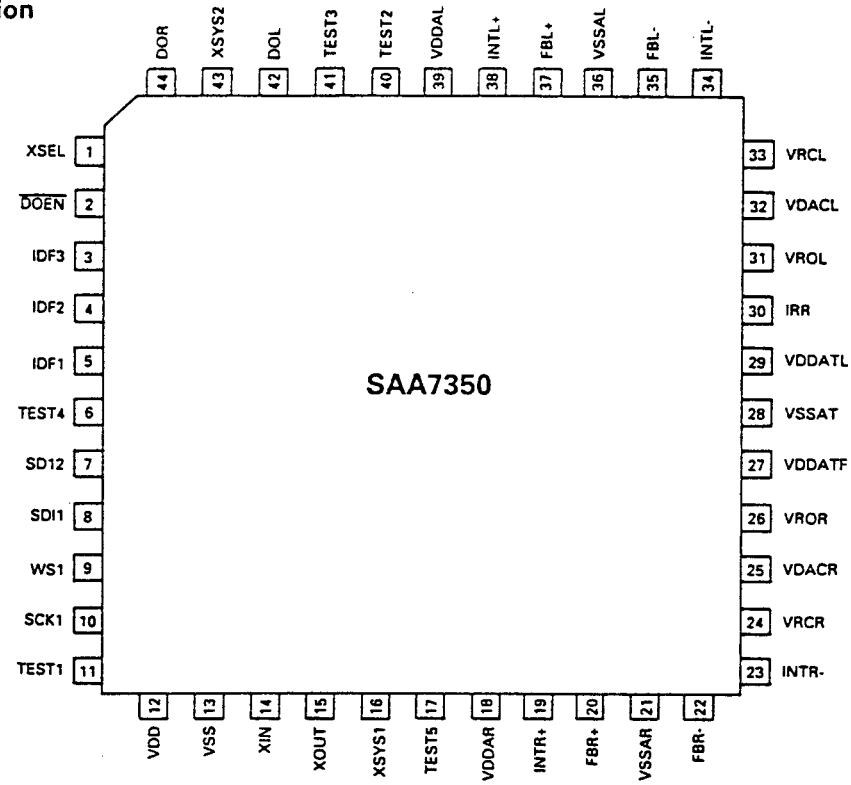
Pin No.	Symbol	I/O	Description
90	V_{DD}	—	Digital power supply.
91	MIRR	O	Mirror signal output.
92	DFCT	O	Defect signal output.
93	FOK	O	Focus OK output.
94	FSW	O	Output filter switching output for spindle motor.
95	MON	O	ON/OFF control output for spindle motor.
96	MDP	O	Spindle motor servo control.
97	MDS	O	Spindle motor servo control.
98	LOCK	O	HIgh output GFS is sampled at 460Hz and that is High; Low output when GFS is sampled 8 times and that is Low.
99	SSTP	I	Disc innermost track detection signal input.
100	SFDR	O	Sled drive output.

Notes:

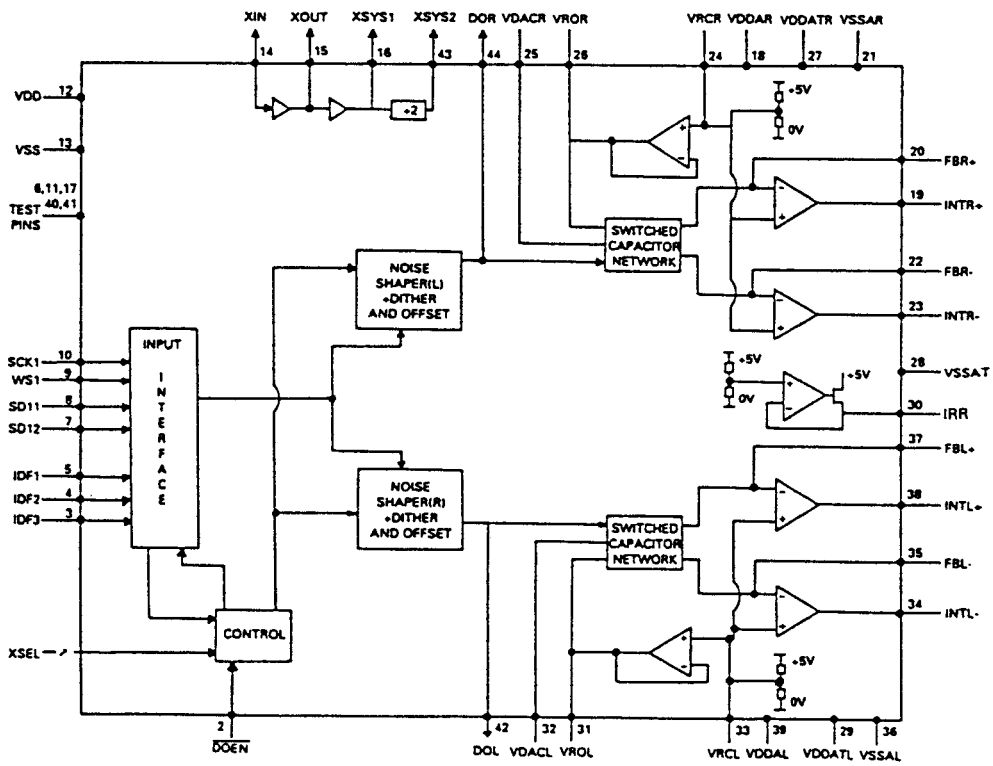
- The 64-bit slot is a 2's complement output beginning with LSB. The 48-bit slot is a 2's complement output beginning with MSB.
- GTOP is used to monitor the protection condition of frame sync. (High: sync protection window open)
- XUGF is a negative-pulse frame sync derived from the EFM signal. It precedes sync protection.
- XPLCK is an inverse of the EFM PLL clock. PLL is generated in such a way that its falling edges are synchronous with change points of the EFM signal.
- The GFS signal goes High when frame sync matches the timing of interpolation protection.
- RFCK is a 136 µs cycle signal having the same clock accuracy as the crystal oscillator frequency.
- C2PO indicates an error condition of DATA.
- XRAOF is generated when the 32k RAM exceeds its ± 28 frame jitter margin.

SAA-7350GP/M3 : IC109

1. Pin Configration



2. Block Diagram



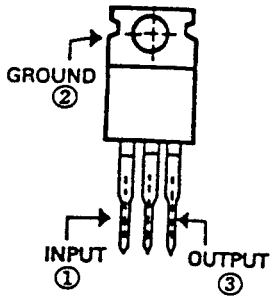
3. Pin Function

Pin No.	Mnemonic	Description
1	XSEL	Crystal frequency select. This pin is used to select the master crystal frequency as follows:- XSEL HIGH = 384fs XSEL LOW = 256fs This pin defaults to XSEL HIGH when not connected.
2	DOEN	One-bit Digital Output Enable. When LOW, the one-bit code outputs are made available for TDA 1547 (DACZ). If unconnected the pin will default HIGH.
3	IDF3	Input data format. These three pins determine the input format the device.
4	IDF2	is to operate in (see functional description). If unconnected these pins.
5	IDF1	will default HIGH (i.e. burst clock mode).
6	TEST4	Test 4: This pin should be left open circuit.
7	SD12	Serial Data Input. Used in simultaneous mode only (for the right channel signal). When not used, this pin will be internally pulled high.
8	SDI1	Serial Data Input. This should be a 16, 18 or 20-bit linear 2's complement PCM signal. In simultaneous mode this pin is used for the left channel signal.
9	WSI	Serial input Word Select signal. Signifies whether data word is for the left or right channel. Can be either fs, 2fs, 4fs or 8fs where fs is the system sampling frequency. fs can lie between 16kHz and 53kHz.
10	SCKI	Bit clock input for the serial input interface.
11	TEST1	Test 1. This pin should be left open circuit.
12	VDD	+5V power supply for the digital section.
13	VSS	Ground connection for the digital section.
14	XIN	Crystal Oscillator Input.
15	XOUT	Crystal Oscillator Output.
16	XSYS1	Buffered Oscillator Output.
17	TEST5	Test 5. In normal operation this pin should be tied LOW.
18	VDDAR	Analogue 5V supply for right channel.
19	INTR+	Output from the Right Positive switched-capacitor integrator. Input to differential op-amp.
20	FBR+	Feedback connection for the Right positive switched-capacitor integrator.
21	VSSAR	0V supply for right channel.
22	FBR-	Feedback connection for the Right Negative switched-capacitor integrator.
23	INTR-	Output from the Right Negative switched-capacitor integrator. Input to differential op-amp
24	VRCR	High impedance voltage reference for right channel inputs. Typically VDDAR/2.

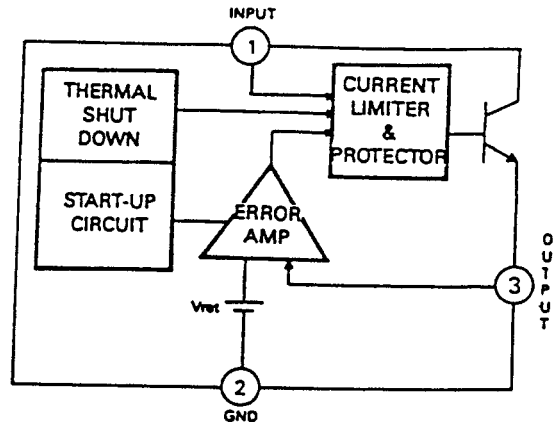
Pin No.	Mnemonic	Description
25	VDACR	Reference voltage Supply for Right channel DAC's. Normally this will be Connected to VSS.
26	VROR	Right channel voltage Reference Output. Typically VDDAR/2.
27	VDDATR	5V supply for right channel analogue timing.
28	VSSAT	0V supply for left and right channel analogue.
29	VDDATL	5V supply for left channel analogue timing.
30	IRR	24kohm bias resistor connection for the reference current generator circuit.
31	VROL	Left channel Voltage Reference Output. Typically VDDAL/2.
32	VDACL	Reference Voltage Supply for Left channel DAC. Normally this will be connected to VSS.
33	VRCL	High impedance voltage reference for left channel inputs and for bias current generator. Typically VDDAL/2.
34	INTL-	Output from the Left Negative switched-capacitor integrator. Input to differential op-amp.
35	FBL-	Feedback connection for the Left Negative switched-capacitor integrator.
36	VSSAL	0v supply for left channel.
37	FBL+	Feedback connection for the Left Positive switched-capacitor integrator.
38	INTL+	Output from the Left Positive switched-capacitor integrator. Input to differential op-amp.
39	VDDAL	Analogue 5V supply for left channel.
40	TEST2	Test2: This pin should be left open circuit.
41	TEST3	Tset3: This pin should be left open circuit.
42	DOL	Digital Output Left. Left channel one-bit code for TDA 1547 (DAC7), when disabled this pin will be driven LOW.
43	XSYS2	Output clock at a frequency of half the master clock frequency.
44	DOR	Digital Output Right. Right channel one-bit code for TDA1547 (DAC7). When disabled this pin will be driven LOW.

GD78XX : IC101, IC102, IC104

1. Package Outline

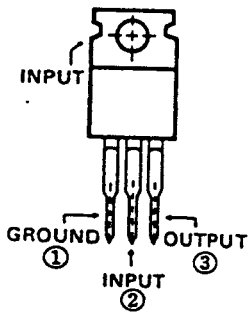


2. Block Diagram

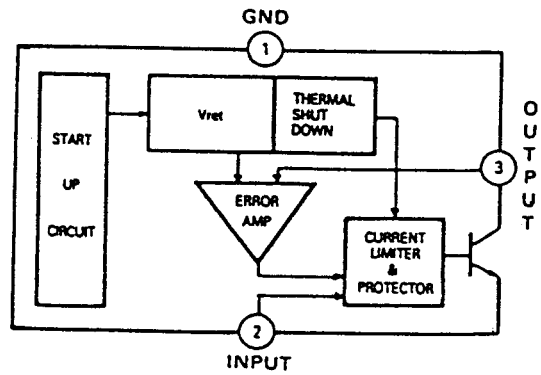


GD79XX : IC103

1. Package Outline

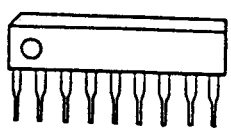


2. Block Diagram

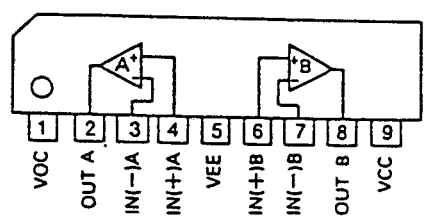


NJM4560S
KIA4559S : IC111

1. Package Outline

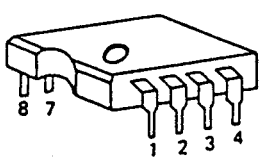


2. Block Diagram

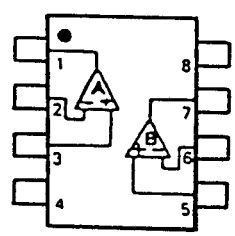


KA4558 (Op amp) : IC108

1. Package Outline



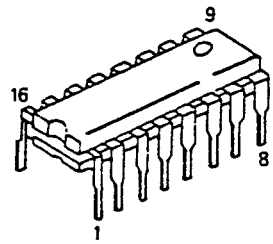
2. Block Diagram



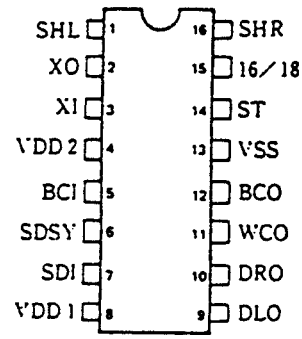
1. A OUTPUT
2. A −INPUT
3. A +INPUT
4. V−
5. B+ INPUT
6. B− INPUT
7. B OUTPUT
8. V+

IC110 YM3433 (8-times oversampling digital filter)

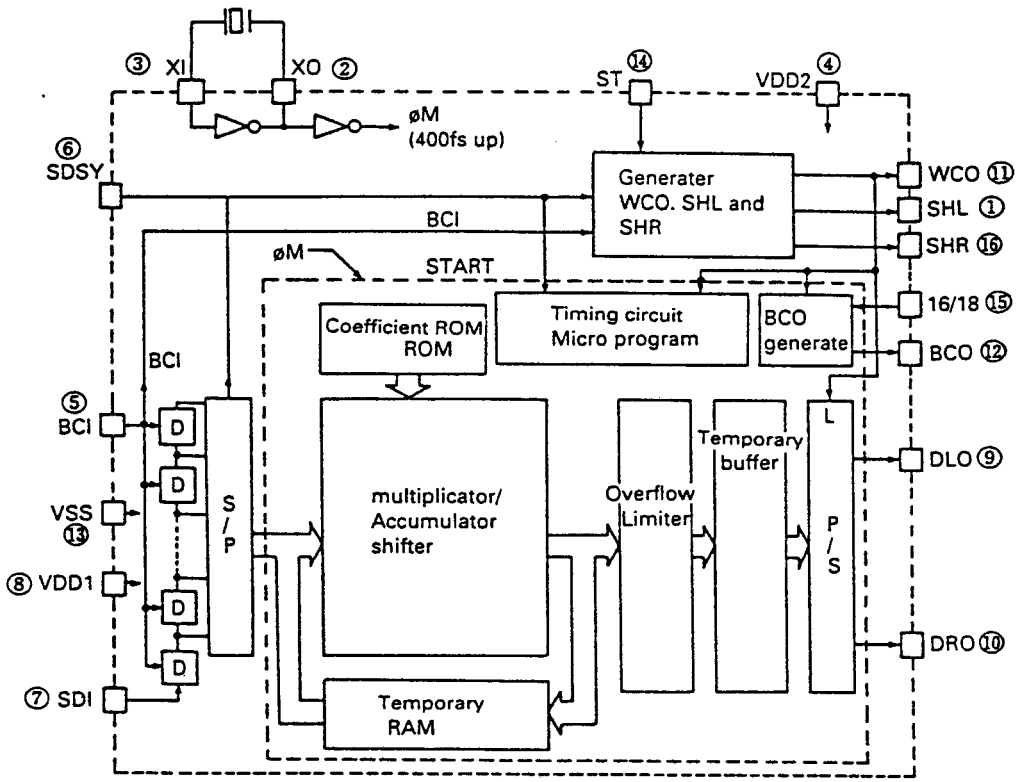
1. Package Outline



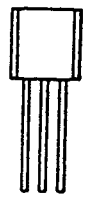
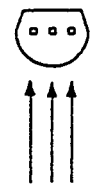
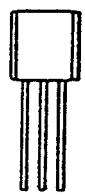
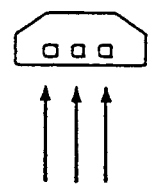
2. Pin Configration

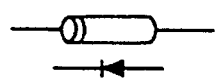
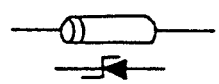


3. Block Diagram



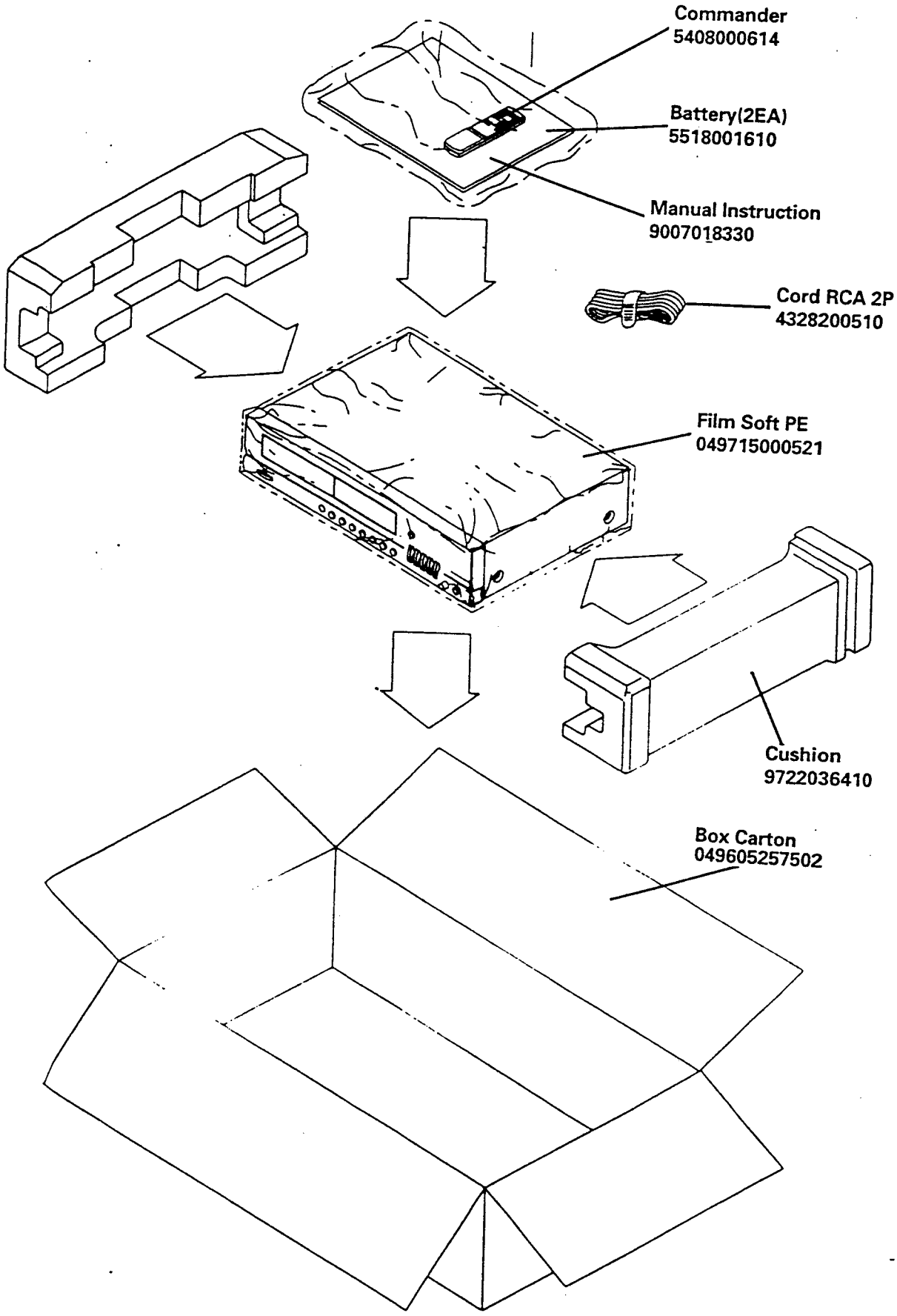
TRANSISTOR AND DIODE LEAD IDENTIFICATION

TRANSISTOR	FRONT VIEW	BOTTOM VIEW
KTA 1268BL KTC 2240B/KTC3200BL KTC 1815Y/KTC 3198Y KTA 1015Y/KTA 1266Y KTA 1302B 2SD 1302S KTC 2235Y/KTC1027 KTC 2236AY KTA965Y/KTA1023	 ECB	 ECB
MPSA 06 MPSA56	 EBC	 EBC
DTA 114YS/KRA107M DTC 114YS DTC 114TS DTC 144E	 ECB	 ECB

DIODE	PACKAGE VIEW
1N 4148 1N 4002	
ZENER	

TERMINAL NAME
B : BASE C : COLLECTOR E : EMITTER

PACKAGE


Commander
5408000614
Battery(2EA)
5518001610
Manual Instruction
9007018330
Cord RCA 2P
4328200510
Film Soft PE
049715000521
Cushion
9722036410
Box Carton
049605257502

SCHEMATIC DIAGRAM

F	G	H	I	J	K

DIGLTAL OUTPUT SIGNAL

FEED BACK Lch. SIGNAL

DIGITAL OUTPUT

R280 L103 C210

M-TRANS

IC109 SAA7350

IC111 KIA4559S

IC101 7808

IC102 7805

IC103 7908

IC104 7808

IC112 LTV817

CD Rch.SIGNAL

CD Lch. SIGNAL

HEADPHONE Rch.SIGNAL

HEADPHONE Lch. SIGNAL

PCB3(PHONE)

PHONE JACK

L-OUT

R-OUT

PCB5 (POWER S/W)

PCB6(LED)

PCB2(POWER TRANS)

AC INPUT 230V 50Hz

T200mA/250V

POWER TRANS 8'D 4001500420

D401

SW501 SW515 SW508 DELETE

SW514 SKIP- SW513

SW506 SKIP+ SW512

SW507 PLAY SW518

SW503 SW516 PAUSE

SW510 SW517

SW504 SW505 STOP/CLEAR

SW509 SW511

PROB/CHECK EDIT TAPE SIZE SW502

RCV501

NOTES

1. Resistor values are indicated in ohms unless otherwise specified
   [K=1.000 M=1.000.000]
2. Capacitor values are indicated in microfarades unless otherwise specified.
   [p=micro-microfarades]

CAUTION

Safety precaution to be followed during servicing

1]Since those parts marked with ⚠ are critical parts for safety. use only the one described in the parts list

2]Before returning the set to the customer make appropriate leakage current or resistance measurements to determine the exposed parts are properly insulated from the supply circuit.

WIRING DIAGRAM

F	G	H	I	J	K

PCB1

ORANGE

CNT102

6P, 100mm

CNT101

ORANGE

PCB7

11P, 160mm

CNT103

RED

RED

6P, 160mm

CNT104

RED

YELLOW
ORANGE
RED
BROWN
BLACK

CNT105

FPC CABLE, 25P, 160mm

PCB4

CNT106

3P, 300mm

PCB3

CNT107

MAIN B'D
400150040OC

BAR CODE

400150041OC
FRONT B'D

400150043OC